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The quality of caregiving that infants receive is critical for predicting adaptive social and emotional outcomes. Research has examined the degree to which characteristics of the mother contribute to the caregiving environment. The goals of this study were to a) examine the direct effects of maternal global negative and positive emotionality on parenting-specific emotions, b) test the degree to which parenting-specific emotionality mediates the association between maternal global negativity and positive emotionality and maternal sensitivity to distress, c) examine the degree to which maternal sensitivity mediated the associations between maternal global and parenting-specific emotionality and toddlers' emotion dysregulation, and d) determine the degree to which infant temperament moderated the association between maternal sensitivity to distress and toddlers' emotion dysregulation.

Drawing from a sample of 259 first time mothers, maternal global emotionality was assessed prenatally during the third trimester via maternal self-report, and maternal mother-oriented and infant-oriented emotions were assessed via maternal self-report when infants were 6-months old. At 14-months, mothers and infants participated in a series of distress eliciting tasks and maternal sensitivity was observationally coded, and mothers reported on supportive and non-supportive emotion socialization practices. At 26-months, mothers and toddlers participated in another laboratory visit and toddlers' behavior was observationally coded from several tasks to assess toddlers' compliance, venting behaviors, and percent time toddlers spent displaying negative affect, and mothers reported on infants' temperament and toddlers' behavioral problems. Results indicated that maternal global negativity and mother-oriented emotions were associated with higher emotion dysregulation, and contrary to hypotheses, this was not mediated by maternal sensitivity to distress. Additionally, observed infant distress at 14-months was associated with lower maternal sensitivity to distress, but this effect was stronger for mothers who were higher in infant-oriented emotions compared to mothers lower in infant-oriented emotions. Taken together, these findings provide insight to the differential role of positive/infant-oriented emotions and negative/mother-oriented emotions in predicting parenting

and emotion dysregulation and can be used to inform parenting intervention and education programs. Strengths, limitations, and future directions for research are discussed

THE ROLE OF MOTHERS' GLOBAL AND PARENTING-SPECIFIC EMOTIONALITY IN RELATION TO PARENTING AND TODDLERS' EMOTION DYSREGULATION

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CHAPTER I: INTRODUCTION

Caregivers and the interactions they have with their children are critically important for adaptive social and emotional functioning. The importance of these interactions is clear from early infancy. During this time, children are entirely dependent on their caregivers to respond to their physical, social, and emotional needs. Maternal sensitivity is characterized by mothers' ability to recognize and interpret infants' cues accurately and respond in a way that meet their infants' needs (Ainsworth, Bell, & Stayton, 1974). Infants that receive consistent, sensitive caregiving have better social and emotional outcomes, including a secure parent-child attachment, more adaptive emotion regulation skills, and higher quality peer relationships compared to children who receive less sensitive caregiving (Leerkes, Blankson, & O'Brien, 2009). More recently, attention has shifted from sensitivity in a global sense to sensitivity to specific infant cues or in specific contexts (i.e., sensitivity to infant distress or in distressing contexts vs. sensitivity to nondistress or in nondistressing contexts) (Leerkes, 2010; McElwain & Booth-LaForce, 2006). Sensitivity to infant distress provides unique opportunities for mothers to communicate to infants that they are available for the infants in times of need and to reinforce lessons about how to regulate emotions. Researchers in this line of work have demonstrated that sensitivity to infant distress has unique predictive power to specific child outcomes over and above sensitivity to nondistress (Leerkes, Weaver, & O'Brien, 2012). Given these clear connections between parenting and child outcomes, researchers have focused on identifying and understanding predictors of maternal sensitivity, and contexts in which parenting serves as a mechanism transmitting the effects of maternal characteristics to children's outcomes (Lin et al., 2019; Ostlund et al., 2019). Researchers have traditionally focused on four domains of predictors: stable parent-factors (e.g., personality, psychopathology), context dependent responses (e.g., maternal arousal and regulation within the parenting context), infant characteristics (e.g., temperament, prematurity status and other health conditions), and larger contextual factors (e.g., social support, romantic relationship quality, socioeconomic status, neighborhood characteristics; Belsky, 1984). Each of these factors can directly and indirectly affect the quality of the caregiving interaction. In the current study, I focus on emotional

predictors of mothers' parenting behavior and how these parenting behaviors then are associated with toddlers' later development.

Researchers who examine aspects or features of maternal emotionality vary in their conceptual definitions of these constructs. Global markers of emotionality can be defined as the characteristics and traits that influence general emotion responses in a way that is not context dependent. In other words, global markers of emotionality reflect a consistent, typical way of responding across a range of contexts and situations. These markers have been examined extensively in the empirical literature. Predominately, researchers have focused on associations between maternal negative emotionality (e.g., anger, hostility, anxiety, depression) and parenting behaviors (Leerkes & Augustine, 2019). Maternal negative emotionality has received the majority of the attention given the saliency of negative emotions in the parenting context, particularly during times of challenge. Although positive emotions have received less attention in the literature, there are clear theoretical and empirical connections between mothers' positive emotional characteristics and their parenting behavior. For example, mothers that were higher in global positivity were more supportive and positive in their interactions with their children (Rueger, Katz, Risser, & Lovejoy, 2011). Thus, examining the valence of global felt emotions (i.e., positive versus negative) is critical for understanding and predicting parenting behavior.

The parenting context is primed to evoke emotions from parents, and these felt emotions can influence parenting behaviors. Caregivers may feel a variety of emotions when engaging with their children, ranging from anger when they misbehave to pride when they take their first steps. In the current study, emotional characteristics that are evoked during the parenting context are referred to as parenting-specific emotions. Researchers have conceptualized these emotions as being generally positive or generally negative and have explored the role of discrete emotions or classes of discrete emotions. However, another approach to examining maternal emotions during a parenting interaction is to examine the underlying reason or cause of the parenting emotion. Mother-oriented emotions reflect mothers' emotional concerns for their own well-being and comfort. For example, mother-oriented emotions reflect emotions related to mothers' concern for their own emotions because the sound of crying bothers them. Mothers who

experience high mother-oriented emotions (e.g., anger at the infant for being upset), may display behaviors that reflect prioritizing their own emotions (e.g., harsh discipline behaviors). On the other hand, infant-oriented emotions reflect emotions related to mothers' concern for their infants' well-being and comfort. Mothers display infant-oriented emotions when they feel upset for their infants. Mothers who experience high infant-oriented emotions (e.g., anger on behalf of the infant when upset), may display behaviors that reflect sensitive behaviors that are prioritizing infants' emotions (e.g., determining the cause of distress and acting a way that alleviates distress). The key difference between these two types of parenting-specific emotions is whose needs are the primary focus or underlying cause of the emotion, the mother or the infant. In the current study, I draw from social information processing theories that emphasize the connection between global emotionality and behavior (e.g., Lemerise & Arsenio, 2000), and from parenting-specific social information processing theories that emphasize the links between global emotionality, parenting-specific emotionality, and parenting behaviors (e.g., Dix, 1991; Leerkes & Augustine, 2019).

Historically, parenting and its effects on child outcomes has been conceptualized in many ways. Given my focus on maternal emotions, parenting, and the development of children's emotion regulation, I draw primarily on attachment and developmental psychopathology perspectives. First, a focus on maternal sensitivity to infant distress draws from Ainsworth's conceptualization of maternal sensitivity and applies it to examining parenting in distressing contexts (Ainsworth et al., 1974). Sensitivity to distress reflects mothers' abilities to anticipate, identify and interpret their infants' distress states and to contingently respond in a way that meets infants' needs in the context of distressing situations. Sensitivity to distress is a documented predictor of children's attachment security, behavior problems, and emotion regulation. Second, developmental psychopathology allows for the examination of complex processes that contribute to the development of psychopathology in children. This perspective integrates the role of parenting and children's characteristics in understanding the development of psychopathology. In the current study, I aim to examine how sensitivity to distress and maternal responses to infants' negative emotions, hereby called sensitivity to distress, are predicted by maternal global and parenting-specific emotionality and how they predict toddlers' emotion dysregulation.

Emotion regulation is defined as the automatic or intentional processes that assist in handling emotional reactivity in a way that promotes optimal functioning within a context (Calkins & Leerkes, 2004; Cole, Martin, & Dennis, 2004). The development of emotion regulation is one of the hallmarks of early childhood. There are many factors that contribute to the development of emotion regulation, but one of the most salient predictors in early infancy is the parenting environment, including the quality of parenting. Early parent-child interactions are critical for emotion regulation because the development of emotion regulation begins in the early years of life and infants are highly dependent on assistance to regulate their emotions. Adaptive emotion regulation during infancy has implications for emotion regulation throughout the lifespan (Leerkes et al., 2009). Thus, understanding the processes and factors that predict, underlie, and are consequences of emotion regulation development during this time is critical. In the current study, emotion dysregulation (i.e., dysregulated/high negative affect, use of maladaptive regulatory behaviors, and dysregulated behavior such as aggression and noncompliance) is examined given their clinical implications over time (Cole & Hall, 2008; Shaw, Stringaris, Nigg, & Leibenluft, 2014).

The current study uses a theoretical framework that assesses the paths from global emotion characteristics to parenting-specific emotions, to maternal sensitivity to distress, to toddlers' emotion dysregulation. The current study has four goals. First, there is a lack of empirical work that considers the association between global emotional characteristics and context-specific emotional responses, specifically in the parenting context. Mothers' global emotion characteristics, or typical emotions in responding to events, may contribute to mothers' emotionality during parenting-specific contexts. Thus, the first goal of the current study is to examine the direct effects of maternal global negative and positive emotionality assessed during the prenatal period on later parenting-specific emotional responses.

Second, the current study will shed light on the process by which global emotional traits predict maternal sensitivity to distress. That is, it will clarify if global emotionality has direct effects on parenting or if such effects are indirect via parenting-specific emotions. An important additional contribution of the first and second goal is the focus on both positive and negative

emotions. Previous work has emphasized how negative emotions affect parenting responses, with less work focusing on positive felt emotions. Understanding how both negative and positive maternal emotions operate in relation to parenting can greatly inform parenting education and intervention efforts as well.

The link between sensitivity to distress and toddlers' emotion dysregulation has been well established in the literature. Infants that receive more sensitivity to distress throughout infancy are typically better at regulating emotions during challenging tasks compared to infants that receive less sensitivity to distress (Calkins & Leerkes, 2004). However, less in known about how mothers' own emotional processes contribute to emotion dysregulation in infants, and the few studies that have examined the transmission of emotion dysregulation from mothers to infants have focused on physiological indicators of maternal emotion (see Leerkes, Su, Calkins, O'Brien, & Supple, 2017; Ostlund et al., 2019). Thus, the third goal of the current study is to determine the direct and indirect effects of prenatal maternal global emotionality, maternal parenting-specific emotionality when infants are 6-months old, and sensitivity to distress behaviors at 14-months on toddlers' emotion dysregulation.

Finally, parent-child interaction is dynamic and transactional such that both parents and infants contribute to the quality of interactions (Sameroff, 2009). In the current study, I am interested in examining how children's distress in the moment contributes to maternal sensitivity to distress in the moment and the extent to which temperamentally based infant negative emotionality moderates the effect of maternal sensitivity to distress on toddlers' emotion dysregulation. Although infants' distress in the moment and temperamentally based negative emotionality should be correlated because a stable trait should drive behavior in the moment, they are not one in the same. That is, temperamental negative emotionality reflects heightened levels of anger, fear, and sadness that is. Infant negative emotionality is stable across time and normative daily contexts, and therefore not influenced by normative daily fluctuations in fatigue and mood. In contrast, observed infant distress in the moment is based on a single observation, and in this study was assessed during tasks that were deliberately designed to exaggerate normative daily stressors. Thus, infant distress in the moment is more strongly tied to the specific

contextual demands and temporary mood states. In other words, an infant who is low or moderate on temperamental negative emotionality, could still become highly distressed during this particular interaction. I am interested in examining the role of infant distress in the moment in relation to maternal sensitivity, and the role of the child's stable temperamentally based negative emotionality in relation to the subsequent emotion dysregulation. The infant's stable negative emotionality in normative daily contexts is most relevant to the socialization of emotion dysregulation behaviors in infants over time. I hypothesize that infant negative emotionality serves two important roles in the pathways under examination in the current study. First, infant distress in the moment has a known effect on caregiving in-the-moment. In instances of heightened distress, mothers that are otherwise sensitive and responsive to their infants may be less sensitive because infants' distress is emotionally arousing. However, the degree to which this effects mothers may vary based on mothers' parenting-specific emotions. Second, infants that are higher in temperamental negative emotionality benefit the most from receiving sensitivity to distress. However, these infants are less likely to elicit sensitive caregiving over time. Thus, the fourth goal of this study is to examine the varying effects of infant negative emotionality in predicting emotion dysregulation outcomes. Specifically, the current study will examine how infant negative emotionality moderates the association between maternal sensitivity to distress and toddlers' emotional dysregulation.

Another goal of the current study is to examine if and how these processes differ by mother race. In the current study, the sample is half White and half Black, allowing for the potential to examine process level differences between White and Black mothers and dyads rather than focusing simply on mean level differences. Researchers have suggested that emotions may serve a different function for Black mothers compared to White mothers in the parenting context (Thomas, Coard, Stevenson, Bentley, & Zamel, 2009). Further, emotion socialization practices have been found to vary for Black and White mothers (Dunbar, Leerkes, Coard, Supple, & Calkins, 2017). Although these effects have been less explored during early infancy, the indirect effects of emotional processes on parenting and infant emotion dysregulation may vary based on mother race. Thus, in the current study, all maternal emotion-related self-report measures will be tested for measurement invariance. Additionally, in the formal analyses,

process level differences will be examined for Black and White mothers using multigroup analyses.

CHAPTER II: THEORY

The current study draws from several theoretical perspectives and models spanning social relations, antecedent of parenting, parent-child attachments, emotion, and emotion regulation. Integration of varying theories allows for enhanced and nuanced understanding of complex processes associated with predicting maternal sensitivity to distress and child emotion dysregulation outcomes.

Attachment Theory: A Focus on Sensitivity to Distress

Perhaps one of the most widely used parenting theories, Attachment theory serves as the foundation for understanding emotional processes and parenting (Bowlby, 1969). At its core, attachment theory is a biological theory that posits that there is an emotional bond between the child and caregiver and has a primary focus on the importance of this relationship. This bond is a behavioral adaptation that is essential for promoting the survival of infants during early life. At birth, infants are completely dependent on their caregivers for survival and meeting their basic needs. As infants age, they depend on those caregivers for assistance in meeting their social and emotional needs. By the end of the first year of life, infants typically have learned about their caregivers' response style and can even begin to anticipate their caregivers' behaviors. This learned experience and anticipated response style is reflected in the quality of the attachment relationship between the mother and infant which is believed to reflect the infant's internal working model. Internal working model is defined as a sense of self in relation to the world. Infants that develop secure internal working models have a system of trust and a belief that they are worthy of love and care. Infants that develop insecure internal working models may not have such beliefs about themselves and may feel that the rejection or negativity they are used to experiencing is deserved. The internal working models that children develop during infancy serve as a model by which children view themselves in their social world.

Ainsworth and colleagues (Ainsworth, Blehar, Waters, & Wall, 1978) were the first to test these core assumptions of attachment theory by directly observing parent-child interactions during early infancy. One of the main contributions from Ainworth's work in attachment theory is the operationalization of maternal sensitivity. Maternal sensitivity, or the mothers' ability to accurately interpret the infants' signals and respond contingently and appropriately given the state of the infant, reflects the quality of parenting that the infant receives. This construct has received much empirical attention since 1978 and has been associated with many child developmental outcomes, including more adaptive emotion regulation strategies (Cassidy, 1994), lower internalizing and externalizing behavior problems throughout early childhood (Moss et al., 2011), and a secure attachment relationship between caregiver and child (Atkinson et al., 2000).

Attachment theory is not a traditional emotion theory, but rather a parenting theory that exemplifies emotion-related behaviors. It is based on the premise that caregivers respond to their infants' signals, which during the first year of life are typically distress cries. Notably, much of the previous work on parenting and attachment has examined sensitivity to nondistress, meaning that sensitivity has been assessed during play or caregiving tasks. More recently, there has been a shift from studying sensitivity to nondistress to sensitivity to distress based on the view that attachment relationships evolve primarily from children's sense that parents will protect them and keep them safe in times of threat or challenge. Parenting is most difficult during times of distress, and it is likely that maternal emotions are salient in undermining sensitive parenting during these difficult times. Some researchers have argued that sensitivity to distress is an entirely separate construct from sensitivity to nondistress (Leerkes et al., 2009; McElwain & Booth-LaForce, 2006). Indeed, this emerging body of work has demonstrated that sensitivity to distress does function differently than sensitivity to nondistress in certain instances, both in its antecedents and predictive value. For example, Leerkes et al. (2012) found that mothers' socio-demographic risks (i.e., age, relationship status, income) was a stronger predictor of sensitivity to nondistress compared to sensitivity to distress. Additionally, sensitivity to distress, and not nondistress, was predicted by maternal cognitive processing of infant emotions. Further, McElwain and Booth-LaForce (2006) found that sensitivity to distress, but not nondistress was associated with secure attachment. Attachment theory serves as a foundation for the focus of the

current study, but other theoretical models are useful in understanding the emotional processes that underlie sensitivity to distress.

Theoretical Approaches to Studying Maternal Emotions and Parenting

Integrated Social Information Processing Perspective

The Social Information Processing perspective (SIP; Crick & Dodge, 1994) is a model for examining the cognitive processes that are involved during social interactions. This theory posits that individuals enter into social situations with a database of information and characteristics, including, but not limited to memory, learned social expectations, and social schemas. This database is constantly being updated based on feedback from social transactions. Upon entering a social situation, an individual may encode the environmental cues around them before interpreting those cues. These first two steps are largely cognitive and occur relatively instantaneously. Next, the individual organizes the information in a way that is centered around their goals in the social situation before constructing, deciding, and acting upon a response. Then, the individual evaluates the response based on new social cues before returning to the start of the cycle. Importantly, this model was unique because it was one of the first non-linear models of information processing. At each step above, there are feedback loops that may result in revisiting previous steps based on new information, the decisions that were made, and environmental cues.

Although there were many strengths to Crick and Dodge's (1994) model, one key component of social transactions that was missing was the inclusion of emotional processes throughout this cycle. Lemerise and Arsenio (2000) proposed an integrated SIP perspective that includes emotion and emotional processes throughout. Overall, this integrated model adheres to the same components of the original model, while adding emotional processes throughout. At the database level, Lemerise and Arsenio (2000) add affect-event links, which represent the emotional contributions of past experiences, in addition to cognitive components, that individuals bring to social transactions. Another important component to this model is the

addition of emotion processes as a sublevel of the social interaction. This level places emphasis on the importance of stable, trait-like emotional characteristics, such as emotionality and temperament while also considering fluctuating day-to-day changes in mood-states and background emotions and acknowledges how these contribute to the data base. Further, this model highlights the role of empathy and emotion recognition throughout the process and transaction. Importantly, even with the additions of emotion-specific components throughout each step, at each step there are bidirectional implications between the step and emotional processes, suggesting that emotions are a central, but malleable, part of social interactions.

The integrated SIP perspective provides a framework by which emotions, cognitions, and context interact to influence social interactions and transactions. However, this theory was designed to explain children's behavior in peer relationships, although the tenants can be applied to any social relationship. In fact, researchers have examined the role of social information processing in the parenting context, most frequently using SIP perspective in child abuse literature (e.g., Azar, Miller, Stevenson, & Johnson, 2017). Thus, applying it to the current study provides a context by which mothers interpret and encode social information during the parenting context, which ultimately, informs behaviors. Next, I turn to parenting-specific models that incorporate emotions.

Affective Organization of Parenting

The affective organization of parenting (Dix, 1991) is a theoretical model that specifically underscores how parental emotions affect parenting processes and child development. This theory has four underlying assumptions: 1) emotion universally accompanies and affects parenting; 2) parents' emotions often reflect the quality of the caregiving environment; 3) contextual characteristics of the parent (e.g., occupation, marital relationships) can spill-over into the parent-child relationship through the parents' emotional experiences; and 4) chronic and intense negative emotion in the parenting environment may be a sign of family dysfunction.

Dix's (1991) model provides a process-oriented view for how parental emotion affects parenting behavior that integrates emotional and cognitive perspectives. First, emotion *activation processes* occur through automatic or cognitive processes. The characteristics of the emotion (e.g., which emotion, valence) is dependent on how the individual conceptualizes the outcomes, obstacles, and support in the moment of activation. Once the emotion is activated, then *engagement processes* begin. The engagement process is characterized by the degree to which the emotion is organized and oriented to. This may often reflect changes in cognition, physiological responses, motivation, feeling, behavioral readiness, and facial and vocal expressions (Dix, 1991). Third, the *regulation process* in enacted in which desirable emotions are promoted and less desirable emotions are suppressed. Activation, engagement, and regulation processes occur automatically and quickly and inform parenting behavior.

Although the integrated SIP (Lemerise & Arsenio, 2000) and Dix's (1991) model have many points of similarity, like the role of cognitive processing and emotion in determining social interactions, Dix's model is specific toward parenting and parenting behaviors. Thus, it contains several important components that the integrated SIP model is missing that are relevant for the current study. First, Dix discusses the role of the motivations that underlie parenting-specific emotion. Specifically, he posits that emotions can be invested in children's interest or invested in mothers' self-interests, which reflect the current study's conceptualization of infant- and mother-oriented parenting-specific emotions. Emotions that are invested in children's interests can be organized in a way that promotes positive, sensitive, and responsive caregiving that strengthens the parent-child relationship, even if the overall experience is emotionally negative (e.g., heightened distress). Second, Dix's model explicates clearly the roles that emotion can play in parenting processes. Although the parent-child relationship is a social relationship, it does function differently than peer relationships. For example, in a peer relationship, the two individuals are equals, meaning that, generally, one has the same amount of power as the other. This is not the case in the parent-child relationship in which children are dependent on their parents for function and survival. Further, in parent-child relationships, there is a power structure; parents are charged with socializing their children and there are more frequent and less optional social exchanges. Thus, applying theoretical perspectives that were modeled after social

interactions with peers may underemphasize some of the important processes that occur in a parent-child interaction.

Integrated Model: Parental Emotions and Parenting Behavior

Drawing from each of these perspectives, Leerkes and Augustine (2019) developed an integrated model of parental emotions and parenting behaviors (see Figure 1). Specifically, this model accounts for the role of emotions, cognitions, and physiology and their interaction effects on parenting behavior. Importantly, this model takes components of the integrated SIP and applies them specifically to a parenting setting and integrates Dix's (1991) views on attending to the motivational focus of parenting specific emotions (i.e., child or parent-oriented). In this application, the database, which consists of the mothers' own developmental history, personality, adult attachment, and experience with children are at the core of the process. An important distinction in this model from the integrated SIP model is the role of global emotional characteristics and parenting-related emotional characteristics and processes. Global emotional characteristics and processes contains trait emotions, mood, emotional well-being, and global emotion regulation. These reflect mothers' typical pattern of responses in non-parenting environments. Global emotional characteristics can potentially predict parenting-specific emotional processes, including physiological arousal and regulation, behavioral regulation, and felt emotions. Finally, in this model, the 6 steps of social information processing are present, beginning with mothers noticing children's behavior, and ending with parental response.

Importantly, the integrative model can be applied in instances when children exhibit positive behavior or negative social cues. Children's distress in the moment has been associated with deficits in parenting behavior, particularly because heightened infant distress makes parenting more difficult (Leerkes & Augustine, 2019). For example, in early infancy, infant distress in the moment, is associated with lower maternal sensitivity (e.g., Augustine & Leerkes, 2019). This has also been demonstrated in samples using toddlers, demonstrating that children's misbehavior is associated with more negative parenting (Lorber & O'Leary, 2005). Mothers' emotional processes during times of infant distress could be important for better understanding

the associations between infant distress and parenting in the moment. For example, Leerkes (2010) found that infant distress was only associated with lower levels of sensitivity when mothers had more negative emotions about their infants' distress. This is often a neglected part of the model. However, as demonstrated by the studies cited here, the interaction between infant distress in the moment and maternal parenting-specific emotion may play a key role in understanding the effects of infant distress on parenting behaviors.

This model also posits different pathways by which parental emotions may directly and indirectly affect children's outcomes via parenting behaviors. This section of the model is elaborated upon below (see Figure 2). In sum, this integrated model incorporates components of the integrated SIP (Lemerise & Arsenio, 2000), attachment theory and the importance of sensitivity, and the affective organization of parenting (Dix, 1991) to create a comprehensive model that facilitates the examination of intricate contribution of maternal emotions to the parenting process in distressing situations.

Theoretical Approaches to Studying Effects of Parenting on Infant Emotion Dysregulation

Definition of Emotion Regulation and Developmental Processes

Emotion regulation is defined as the automatic or intentional processes that modulate emotional reactivity (Calkins & Leerkes, 2004). Emotion regulation in infancy occurs at multiple levels including physiology, affect, and behavior. Emotion dysregulation is defined as a loss of behavioral and emotional control and engagement in maladaptive regulatory behaviors in challenging situations (Bridges, Denham, & Ganiban, 2004; Leerkes et al., 2009). Dysregulation of negative emotion reflects maladaptive or low emotion regulation, and is highly predictive of subsequent mental health, social, and academic difficulties (Cole & Hall, 2008). Thus, in the following sections, I discuss relevant theoretical perspectives about the development of emotion regulation and behavioral problems believed to result, in part, from poor regulatory abilities.

During the first year of life, emotion regulation evolves substantially and quickly as infants develop. At birth, infants have minimal self-regulation skills and are reliant on their caregivers for regulating their emotions and needs (Kopp, 1982). Around three months, infants begin to develop rudimentary regulation skills that typically are comprised of gaze aversion, thumb sucking, and anticipation of events (Kopp, 1982). During this time, infants engage in more caregiver-oriented regulation, such that behaviors are characterized as promoting proximity to the caregiver. As infants age and motor skills improve, infants engage in more self-oriented behavior, including reaching and attention shifting (Calkins & Hill, 2007). Reliance on caregiver-oriented strategies decreases throughout later infancy and toddlerhood. Typically developing infants that have been reared in supportive and sensitive environments enter toddlerhood and preschool age with a wide set of emotion regulation strategies that they can employ effectively including both caregiver-oriented (e.g., oriented toward caregiver, maintaining proximity to caregiver) and child-oriented (e.g., self-soothing, self-distracting) strategies (Blandon, Calkins, Keane, & O'Brien, 2010).

Although this is the general trajectory of development, parenting can contribute to or hinder the developmental progression of emotion regulation. There are many hypotheses that explain possible mechanisms of transmission from parenting to children's emotion regulation, including attachment-related processes, modeling (e.g., parents display of behavior that children copy), and behavioral reinforcement (e.g., reinforcement or punishment by the parent in response to a specific behavior; Calkins & Leerkes, 2004). In the current study, I focus on attachment-related processes by which parents contribute to children's emotion regulation, given the saliency between attachment-related process and the development of emotional competencies.

Attachment and Emotion Regulation

In early infancy, the core of the attachment relationship exists in the foundation of trust. Infants who have received high quality, responsive, and consistent caregiving learn to trust their caregiver will meet their needs and provide them a safe environment to learn and explore. Through their interactions with caregivers, infants learn how their caregivers are likely to

respond to their distress cues. Infants that develop a secure internal working model learn to trust their caregiver, but also feel confident in exploring new strategies. These infants are often equipped with a range of emotion regulation strategies, including those that are self-oriented and mother- (or caregiver) oriented.

Indeed, the evidence of the effects of attachment and sensitivity and emotion regulation development are evident early in infancy. For example, Cassidy (1994) examined how maternal sensitivity contributed to infants' outward display of emotion while interacting with their mothers. She argued that infants learned to express and regulate their emotions in a manner that fit their mother's apparent preferences. She found that infants who received consistent and responsive caregiving displayed a moderate amount of distress and engaged in a wide variety of emotion-regulation strategies because they learned that their mothers were comfortable with and responsive to both positive and negative affect. Infants with a history of sensitivity develop greater confidence in themselves as regulators. Infants who received inconsistent caregiving seemed to maximize their distress to clearly communicate to their caregivers that they needed them and to keep their mothers nearby. These infants tended to over-rely on mother-oriented emotion regulation strategies but are not soothed by them. Lastly, infants who received nonresponsive caregiving minimized their outward distress. These infants used more self-oriented regulation strategies and fewer mother-oriented regulation strategies because they learned their mothers were more responsive to them when they were not distressed. Infants who tend to minimize their outward display of distress are physiologically dysregulated, meaning that their physiological systems of arousal are heightened, and their regulatory systems are underperforming. Over time, these infants develop emotional control problems resulting in explosive, uncontrollable emotions later. Each of these strategies help the infant maintain proximity to the caregiver, which is essential for survival in early infancy but likely maladaptive in the long run. The lasting implications of these early attachment interactions have been examined. However, attachment theorists and researchers suggest that these processes are not always clear and require a more intricate examination of specific components of parenting processes, including examination individual characteristics of the infants and mothers (Calkins &

Leerkes, 2004). Developmental psychopathology is one approach that integrates child characteristics into understanding the associations between parenting and children's outcomes.

Developmental Psychopathology Perspective

Developmental psychopathology is the study of developmental processes in problem behaviors and psychopathology (Cicchetti & Rogosch, 2002). This perspective posits that multiple factors contribute to the development of behavior problems and psychopathology in children, including environmental factors, such as parenting, and intrinsic factors, such as child temperament. Further, developmental psychopathology places less emphasis on comparisons between typical and atypical development, but rather is focused on the different developmental pathways that brought each group to their outcome (Cicchetti & Sroufe, 2000). Developmental psychopathology emphasizes the importance of the processes that contribute to the development of clinical behavior, which could include maternal emotion and parenting behaviors. Emotion dysregulation is at the core of many clinical diagnoses, including oppositional defiance disorder, conduct disorder, child depression, and anxiety (Cole & Hall, 2008). Thus, understanding the specific effects of maternal emotionality on emotion dysregulation via a psychopathology perspective is critical.

One of the core elements of developmental psychopathology is the interaction between parenting (e.g., an environmental factor) and child negative emotionality (e.g., an intrinsic factor) as risk or protective factors in predicting children's outcomes (Cummings, Davies, & Campbell, 2000). Further, this perspective considers the complex predictors of parenting (e.g., parental emotionality) as part of children's environmental influences too. Thus, this perspective is ideal for considering the effects of maternal emotionality on parenting behaviors, and the implications they have on children's emotion dysregulation. Children experience parenting in different ways, and parenting affects different children idiosyncratically. One possible explanation as to why parenting has varying effects on children's adjustment outcomes could be the children's temperament, or specifically negative emotionality. Negative emotionality is trait-like individual differences in the frequency, intensity, and duration of negative affect. Infants higher in negative

emotionality are more reactive and responsive to changes in their environments, suggesting that infant negative emotionality directly effects children's emotion regulation over time. Infants who are higher in negative emotionality require the most help from their caregivers with regulating their distress and are affected negatively if faced with less-than-optimal caregiving. Suboptimal caregiving for reactive children may have more of an effect on the development of emotion dysregulation compared to infants that are lower in negative emotionality, or less reactive (e.g., Morris et al., 2002; Stright, Gallager, & Kelley, 2008). In the current study, consistent with the developmental psychopathology perspective, infant negative emotionality is expected to interact with maternal sensitivity to predict toddlers' emotion dysregulation.

There is a bit of overlap in how developmental psychopathology and attachment theorist think about how parenting contributes to emotion dysregulation. From the attachment perspective, emotion regulation, in part, reflects the quality of the attachment relationship. In the developmental psychopathology perspective, parenting functions as one of many possible contributors to emotion regulation. Developmental psychopathology yields other modes of transmission, including genetics, contagion, reinforcement and modeling that help explain how parenting contributes to the development of emotion regulation and dysregulation. Although classic attachment theorists do not consider temperament to be an important factor in predicting parenting and children's outcomes, this view is shifting, and recent scholars of attachment theory have acknowledged the contribution of infant negative emotionality (Calkins & Leerkes, 2004).

Comparable to the developmental psychopathology perspective, Leerkes and Augustine (2019) proposed another model by which parental emotions are transmitted to children's outcomes (see Figure 2). Specifically, this model posits three paths by which parental emotions are associated with adaptive child outcomes: a) direct path, b) indirect effects via parenting, and c) via moderators of parenting effects. The first path, the direct effects from parenting-related emotions to child outcomes, is highlighted by factors such as children's direct exposure to maternal dysregulation (i.e., emotion contagion), biological synchrony with regulated or dysregulated maternal physiology, and genetic transmission. Second, the indirect effects of parenting-specific emotions on child outcomes via optimal (or suboptimal) parenting, highlights

parenting as a mechanism of transmission from maternal emotionality to child outcomes, specifically through sensitivity, discipline, and autonomy promotion. It is anticipated that the effects of maternal parenting-specific emotions on toddlers' emotion dysregulation will be indirect via sensitivity to distress rather than direct. It is not necessarily the felt emotion that effects children's adjustment, but rather how maternal felt emotion effects parenting behaviors. Each of these possibilities is highly consistent with developmental psychopathology perspective, such that maternal characteristics, infant characteristics, and environmental factors contribute to the development of adjustment problems. This is the first empirical test of the direct and indirect effects (i.e., path a and b) in relation to child outcomes using felt maternal emotions.

Summary and Conclusion

Multiple perspectives guide the current study. Integration of theoretical perspectives and models allows for a rich discussion of the emotional processes that underlie parenting and how maternal emotion and parenting predict toddlers' emotion dysregulation. The emotional theories used in predicting sensitivity to distress convey that maternal emotion is an important predictor of parenting behavior and there are multiple paths by which this occurs. First, maternal emotionality directly affects parenting behavior (e.g., higher global negative emotionality associated with less sensitivity to distress). Second, maternal emotionality also indirectly affects parenting via its effects on parenting-specific emotionality (e.g., higher negative emotionality is associated with more mother-oriented emotions, which is in turn associated with less sensitive caregiving). The presented theories centering on the associations between parenting and emotion dysregulation vary in some ways, yet they relay similar themes: a) the development of adaptive emotion regulation can have a significant and substantial effect on later social and emotional functioning, as well as a strong clinical implication, b) parenting contributes in some way to the development of emotion regulation, c) infant negative emotionality serves as a moderator of the link between parenting and emotion dysregulation, and d) parents and caregivers also contribute to the variations in this process beyond parenting behavior (e.g., moderators and mechanisms of transmission). Given the clinical significance of emotion regulation and dysregulation, in the current study, I aim to focus on the most maladaptive dysregulation tendencies, including

egregious behaviors like yelling and hitting during a challenging task and high indicators of problem behavior.

CHAPTER III: LITERATURE REVIEW

Maternal Emotionality and Parenting

Effects of Maternal Global Emotionality on Parenting Behaviors

Theoretical models hypothesize that global traits and characteristics influence social interaction and social relationships directly and indirectly (Leerkes & Augustine, 2019; Lemerise & Arsenio, 2000). Direct influences on parenting interactions are evident in literature examining personality traits, psychopathology, and global emotion regulation processes. Several researchers have identified associations between global emotionality and parenting outcomes. For instance, trait anger, hostility, and anxiety have been associated with less maternal sensitivity (Burrous, Crockenberg, & Leerkes, 2009), harsh parenting (Di Giunta et al., 2020), and less effective discipline including both over-reactive (Rhoades, Grice, & Del Vecchio, 2017) and lax-discipline (Robinson & Cartwright-Hatton, 2008). Similarly, negative personality traits, such as neuroticism, characterized by increased negative emotionality and emotional instability, have been negatively associated with parenting, both directly and indirectly through other cognitive and emotional mechanisms (Metsapelto & Pulkkinen, 2003; Prinzie et al., 2019).

Although considered less frequently, positive trait emotionality has been associated with higher sensitivity (Smith et al., 2007), and more positive parenting (Atzaba-Poria et al., 2014; Jeon & Neppl, 2019). Mothers higher in agreeableness, extraversion, conscientiousness, and openness to experience, all traits that are associated with greater reported happiness and positive emotionality (Mill, Realo, & Allik, 2016), tend to engage in higher maternal sensitivity and warmth than other mothers (Prinzie et al., 2019). Most authors argue that the reason trait emotions and similar characteristics (e.g., personality) are associated with parenting is because people who are generally prone to experience heightened positive or negative emotions are more likely to experience those types of emotions during parenting. These in the moment emotions

have the potential to influence their behavior. Next, I summarize evidence that global emotionality is in fact associated with parenting-specific emotions.

Connections Between Global Emotionality and Parenting-Specific Emotions

Individuals' characteristic style of emotional responding can inform how they emotionally respond in varying contexts. Given the inherent emotional nature of parenting young infants (e.g., unpredictability, high dependence on parents, crying as the primary form of communicating needs, intense feelings of love and protection), there is a connection between these more global, stable emotions that mothers feel and the emotions that they feel during parent-child interactions. It is also possible that the parent-child relationship functions differently, in that the uniqueness of the parent-child relationships may override the negative effects of global negative emotionality on parenting-specific emotions. However, the degree to which this occurs has not been extensively examined in previous work with parents, but rather in samples of adults in which global emotion traits and emotional reactions to infant cry stimuli were measured. Using a convenience sample of undergraduate students, Lin and McFatter (2012) found that global empathy was associated with more empathy toward infants during a cry paradigm and that higher global personal distress was associated with more aversive feelings in response to crying. Similarly, also using a sample of undergraduate college students, Helcher, Beijers, and de Weerth (2015) found that global hostility was associated with more negative emotions when listening to infant cry sounds. Other work that has utilized parents has found that extraversion and global empathy were both associated with higher parenting-specific sympathy after listening and watching an infant cry. However, this effect was relatively small, and the participants had children ranging from infants to 18 years old (Zeifman & St. James-Robert, 2017). In a sample of first-time mothers of infants, Leerkes and Crockenberg (2006) found that mothers' engaged coping styles in response to stress, a global emotional trait, were associated with higher empathy toward their own infants at 6-months of age. Thus, in the current study, the association between global emotionality and parenting-specific emotionality is examined to test the hypotheses that mothers higher in global negative emotionality are more likely to experience negative, self-oriented emotions during a stressful parenting interaction and mothers higher in

global positive emotionality are more likely to experience infant-oriented emotions, such as empathy and sympathy for their infants.

Effects of Maternal Parenting-Specific Emotionality on Parenting Behaviors

Researchers have proposed that understanding *what* emotions parents are feeling is not enough, but rather we need to move toward understanding *why* parents are feeling the emotions to best understand the links between emotions and parenting behavior. One way to explore this is by examining the motivation or underlying cause of emotion to distinguish between parent- or child-oriented emotions. In the following sections, I summarize literature that has focused on mother-oriented and negative parenting-specific emotions, which are typically thought to be associated with compromised parenting, and the literature on infant-oriented and positive parenting-specific emotions, which are thought to be associated with more sensitive and responsive parenting.

Mother-Oriented and Negative Emotions

Mother-oriented emotions largely reflect negative emotions toward infants' distress that are motivated by parents' self-interest. Assessing these types of emotional responses are difficult and researchers frequently rely on self-report questionnaires and emotion interviews that have been transcribed and coded for emotion motivation. It is important to note that they are subject to social-desirability effects, such that parents may not be completely honest when reporting why they are feeling emotions if there is a chance that it may reflect negatively upon the parent and their parenting. Thus, researchers are challenged with provoking and capturing these less-desirable emotions in strenuous contexts. Researchers have demonstrated that mother-oriented (or parent-oriented) emotions have implications for multiple parenting outcomes, including sensitivity, discipline, and harsh and abusive parenting.

Maternal felt negative emotion while parenting has been associated with less optimal parenting practices, including more asynchrony between parent and child (Dix, Gershoff,

Meunier, & Miller, 2004), less sensitivity (Martin, Clements, & Crnic, 2009), and increased overreactive discipline (Lorber, 2012). Researchers have also examined the role of specific negative emotions that are experienced within a parenting context. In a video recall paradigm, Dix and colleagues (2004) examined the role of specific negative emotions and found that maternal worry, sadness, anger, and guilt operated differently in predicting maternal support and synchronous behaviors. Maternal worry for the child was associated with less asynchrony and restrictive behaviors for mothers of young toddlers. Maternal sadness and anger, presumably focused on maternal needs, operated similarly to one another, such that higher anger and sadness were associated with more asynchronous behavior. Maternal guilt was associated with more asynchronous behaviors. Further, anger was also associated with more restrictive control. In another study that examined the role of maternal anger, Leerkes and colleagues (2011) found that pregnant mothers who reported feeling angry in response to infant distress, a parenting relevant stimulus that may be indicative of their emotional responses to their own infant post birth, reported higher use of punitive responses to their own infants' distress at 16 months of age.

These felt negative emotions are thought to effect parenting behaviors because they reflect that mothers are focusing on their own feelings and discomfort rather than the infants' (Dix, 1991). One of the most supported links is the negative effect of parent- or mother-oriented anger on parenting behaviors. Mother-oriented anger has been found to be associated with more restrictive behavior and less synchrony between mothers and infants (Bryan & Dix, 2009), lower sensitivity (Leerkes, Su, Calkins, Supple, & O'Brien, 2016), and more frequent use of physical punishment (Lorber, O'Leary, & Slep, 2011). Researchers have posited that one mechanism by which this occurs is via maternal flooding of negative emotion (Del Vecchio et al., 2016; Leerkes & Augustine, 2019). When this flooding occurs, mothers report feeling overwhelmed with anger, undermining their ability to process cues from the interaction. This is particularly important for understanding the associations between mother-oriented anger and harsh and abusive parenting (Lorber et al., 2011). For less egregious parenting, it is likely that similar processes are occurring, albeit to a lesser degree. For example, Leerkes (2010) found that higher mother-oriented negative emotions have been associated with less sensitive caregiving, as well as other indicators of maternal cognition, such as accuracy of identifying infants' emotions and

endorsement of more mother-oriented caregiving goals (e.g., wants to calm infant because it interferes with mother's productivity).

Infant-Oriented and Positive Emotions

Infant-oriented emotions reflect parents' feelings about infants' states that reflect infants' interests or concerns for infants. Generally, these infant-oriented emotions are based in positive feelings, or positive regard for the infant. Compared to parenting-specific negative emotions, work with parenting-specific positive emotions is minimal, and centers around effects of empathy and positive discrete emotions (e.g., joy). Maternal empathy for infants' during times of distress is a key underlying component of attachment theory and essential for sensitive caregiving (Ainsworth et al., 1978). Indeed, empirical studies have demonstrated support for this in infancy (Koren-Karie, Oppenheim, Dolev, Sher, & Etzio-Carasso, 2002), toddlerhood (Coyne, Low, Miller, Seifer, & Dickstein, 2007), and early childhood (Stern, Borelli, & Smiley, 2015). It is important to note that these studies used cross-sectional assessments of empathy and sensitivity. Few studies have included longitudinal assessments but have demonstrated similar findings. Empathy for the infants during times of distress assessed prenatally during a cry-paradigm is associated with higher maternal sensitivity with mothers' own infants (Leerkes et al., 2016). Mothers higher in empathy may display greater understanding for the child during challenging tasks, which promotes positive parenting. Researchers have demonstrated that infant-oriented emotions are associated with less restrictive parenting, more parental support, and more sensitive caregiving (Bryan & Dix, 2009; Dix et al., 2004; Leerkes et al., 2016). Further, these infant-oriented emotions may reflect an increase in perspective taking that allows for optimal parenting to take place that is centered around children's needs. For example, Dix et al. (2004) found that positive emotion, which was a composite of joy, relief, interest, pleased, and happy, was associated with less unsupportive behavior between mothers and young toddlers.

Role of Infant Distress in the Moment

Infant crying is aversive to parents and other adults (Lin & McFatter, 2012) and elicits strong physiological reactions in the moment (Del Vecchio, Walter, & O'Leary, 2009; Zeifman & St. James-Roberts, 2017). Thus, it is no surprise that infant distress in the moment is negatively associated with concurrently observed sensitivity (Leerkes, 2010; Leerkes et al., 2015), likely because it increases the difficulty of the task at hand. In fact, the negative associations between observed infant distress and concurrent sensitivity have already been established in this sample at the wave of interest (Leerkes et al., 2016). Given the negative impact of infant distress in the moment on parenting, identifying factors that buffer mothers from this effect is of paramount importance. This question has not yet been addressed in this sample.

Crockenberg (1986; Crockenberg & Leerkes, 2003) has long argued that mothers may be more or less susceptible to the negative impact of crying depending on personal and contextual resources or stressors. For instance, Leerkes (2010) found that mothers who were lower in prenatally assessed negative emotions about infant distress and higher in prenatally assessed infant-oriented goals, were less affected by their own infants' heightened distress at 6-months, compared to mothers who were higher in negative emotions and lower in infant-oriented goals. Specifically, for these mothers, sensitivity was undermined to a lesser degree when their own infants were higher in distress. Thus, in the current study, I hypothesize that maternal parenting-specific emotions (i.e., infant- and mother-oriented emotions) will moderate the association between infant negative emotionality and sensitivity to distress. Specifically, infant negative emotionality will be more strongly negatively associated with sensitivity to distress when mothers are either a) higher in mother-oriented emotions, or b) lower in infant-oriented emotions. A key distinction between this study and Leerkes approach, is that I am using a maternal report of parenting specific emotion rather than an extensive interview approach. I am also testing longitudinal associations between parenting specific emotion and subsequent parenting rather than concurrent associations. Thus, results of this study may be of particular interest to clinicians focused on parenting interventions.

SUMMARY

Both maternal global emotionality and parenting-specific emotions have been demonstrated to be associated with parenting behaviors. Although the associations between maternal negative emotionality and sensitivity to infant distress has been clearly depicted in previous literature, the association between positive emotionality and sensitivity to infant distress is less well known. Additionally, the majority of the research presented above has focused solely on cross-sectional studies. Maternal global emotionality was assessed as the same time as parenting behaviors in much of this work. Thus, longitudinal associations between maternal global emotionality and sensitivity to distress have yet to be established. Taken together, mother-oriented and negative parenting specific emotions tend to undermine sensitive caregiving whereas infant-oriented emotions and parenting specific empathy and positive emotions tend to be associated with more sensitive caregiving. Importantly, research that has examined the effects of mother- and infant-oriented maternal emotions is minimal. Thus, in the current study, I aim to expand upon this area of research, providing evidence for the potential role of maternal parenting-specific emotions on sensitivity to infant distress.

Toddlers' Emotion Dysregulation

There are many ways to assess emotion regulation in infants and toddlers, including behavioral coding, maternal self-report, and physiological indicators. These indicators may not always converge in a way that tells a cohesive story of emotion dysregulation. One possible explanation for this is that they are operating on different systems (e.g., behavioral, physiological, and social). These systems of dysregulation may have different antecedents and different effects on long-term outcomes (Keenan, 2000). There may also be differences in timing in how these systems operate. For example, although not included in the proposed study, physiological regulation is more automatic and less conscious during early infancy, whereas children that rely on more self-soothing behavioral regulation techniques may have to process information before acting, delaying the amount of time before regulation behavior can be

observed (Keenan, 2000). Thus, using a multi-modal, latent construct of emotion dysregulation may be a better way to assess the multiple systems of emotion dysregulation.

Effects of Maternal Sensitivity to Distress on Infant/Toddler Emotion Dysregulation

As described previously, the earliest conceptualizations of the role of maternal sensitivity in relation to emotion regulation were provided by Cassidy (1994). Since Cassidy's (1994) work, much research has been published in support of this perspective across multiple indicators of emotion regulation. In the following sections, I discuss the literature that examines the effects of sensitivity to distress on various indicators of emotion regulation and/or dysregulation.

Maternal sensitivity to distress and behavioral and physiological indicators of infant/toddler emotion regulation

One of the most common assessments of emotion regulation is through behavioral coding of infants' and toddlers' behaviors during difficult situations. Specific behaviors are coded as either mother- or caregiver-oriented or infant- or self-oriented. As previously discussed, optimal outcomes occur when infants have a variety of strategies from which they can utilize during challenging situations. Emotion regulation behaviors have been found to be predicted by maternal caregiving and maternal sensitivity. For example, infants that have experienced sensitive caregiving and are securely attached are more likely to engage in caregiving-oriented regulation strategies (Diener, Mangelsdorf, McHale, & Frosch, 2002). Additionally, children that are more securely attached engage in more adaptive emotion regulation strategies when they are in preschool (Qu, Leerkes, & King, 2016). It is likely that the foundation of emotional trust established within the attachment relationship fostered an environment in which children feel confident and comfortable to explore their emotional expressions and build upon their skills. Infants who have received ineffective caregiving are more likely to self-sooth than engage with their caregivers (Diener et al., 2002; Leerkes & Wong, 2012). Lastly, infants who are often ignored by their caregivers are likely to use more passive mother-oriented behaviors (e.g., sitting

in lap and not playing), maladaptive behaviors (e.g., withdrawing from the interaction), and display a limited variety of different emotion regulation behaviors (Leerkes & Wong, 2012). Taken together, there is evidence to suggest that sensitive caregiving provides a context for infants to develop healthy and adaptive responses to stressful situations. Alternatively, insensitive and nonresponsive caregiving may contribute to infants' development of not only poor emotion regulation but may increase infants' risk for emotion dysregulation.

Affect dysregulation, defined as heightened negative affect and inability to modulate, or control heightened affect, has been associated with emotion dysregulation and similar psychopathology outcomes as heightened emotion dysregulation. Indeed, research has examined the extent to which parenting predicts dysregulated affect, although to a lesser degree than some of the other discussed constructs. In early infancy higher quality caregiving has been associated with less affect dysregulation at 2 and 3 years (Braungart-Rieker, Garwood, Powers & Wang, 2001; NICHD Early Child Care Research Network, 2004). Researchers have posited that maternal sensitivity predicts affect dysregulation because of the dependence that infants have on mothers for regulation during early infancy (Erickson & Lowe, 2008). Specifically, if mothers are lower in sensitivity or responsiveness to infant cues, infants learn that they cannot rely on their mothers, and develop their own, potentially maladaptive emotion regulation skills.

A good deal of research also suggests the infants and young children who experience sensitive caregiving also develop better physiological regulation. For instance, children of sensitive mothers are less likely to demonstrate atypical patterns of cortisol reactivity and recovery during stressful tasks (Blair et al., 2015). Further, young children (infants to preschoolers) of more sensitive mothers demonstrate better vagal regulation (i.e., greater withdrawal from baseline to stressor) both concurrently (Moore et al., 2009) and longitudinally (Calkins, Graziano, Berdan, Keane, & Degnan, 2008; Conradt & Ablow, 2010; Perry, Mackler, Calkins, Keane, 2014).

Maternal Sensitivity to Distress and Infant/Toddler Effortful Control.

Effortful control, or children's use of attention to inhibit behavioral responses in order to regulate emotions and behaviors (Morris et al., 2013; Rothbart, Ahadi, & Hershey, 1994), is another indicator of emotion dysregulation in the proposed study. Children who engage in dysregulated behaviors, or children that are more likely to become dysregulated, are likely to be low in effortful control. Empirical studies have demonstrated that maternal sensitivity is associated with higher effortful control throughout infancy (Conway et al., 2014) and into school age (Kopystynska, Spinrad, Seay, & Eisenberg, 2016; Neppl, Jeon, Diggs, & Donnellan, 2020; Spinrad et al., 2011). Similarly, attentional control, or children's ability to maintain attention and focus, ignore distractions, and to appropriately shift attention, has also been associated with dysregulation (Blair, 2002; Mathis & Bierman, 2015). Beginning in infancy, sensitivity has been associated with increased inhibitory control at 18-months (Frick et al., 2017). Effects persist throughout toddlerhood and preschool as well. Specifically, maternal sensitivity increases task orientation in preschoolers (Mathis & Bierman, 2015), facilitates task orientation (Belsky, Fearon, & Bell, 2007), and predicts higher inhibitory control (Swingler, Isbell, Zeytinoglu, Calkins, & Leerkes, 2019). Importantly, the role of sensitivity to distress, specifically, has been less explored in this literature. Conway et al. (2014) assessed sensitivity during a free play session and during the Still-Face procedure, which is only moderately distressing to some infants, and averaged across tasks. Thus, the role of sensitivity to distress specifically has yet to be tested in relation to effortful control.

Maternal Sensitivity to Distress and Other Outcomes

Externalizing behavior problems, characterized by heightened aggression, defiance, and conduct problems, is a common indicator of emotion dysregulation because these behaviors are believed to result, in part, from a child's inability to effectively control and express their negative emotions. Indeed, the associations between parenting and externalizing behavior problems have been well established in the literature throughout developmental ages. Maternal sensitivity to distress has been associated with lower behavior problems at 24- and 36- months (Leerkes et al.,

2009). During infancy, mothers' expected permissive parenting (e.g., self-report of how she expected herself to parent later) at 6-months was found to be associated with higher externalizing behavior problems when infants were 18-months old (Wittig & Rodriguez, 2019). Additionally, similar effects can be seen during toddlerhood; harsh parenting at age 2 is associated with higher externalizing behavior problems at age 3 (Scaramella, Neppl, Ontai, & Conger, 2008). Further, maternal sensitivity at age 2 is associated with fewer behavior problems when children are in kindergarten (Hartz & Williford, 2015). These effects extend throughout middle childhood as well. Specifically, using a latent growth model, Wang, Christ, Mills-Koonce, Garrett- Peters, and Cox (2013) found that maternal harshness at 4 years was associated with externalizing behavior problem intercept and slope, such that children that received harsher parenting were higher in externalizing behavior problems at age 4 and increased quicker in externalizing behavior problems through age 12. Additionally, maternal sensitivity was associated with lower externalizing behavior intercept at age 4.

It is clear that parenting and maternal sensitivity are important for the development of externalizing behavior problems. Intervention efforts have attempted to determine if maternal sensitivity can be changed to predict decreases in externalizing behavior problems. Indeed, Klein Velderman et al. (2016) found that mothers who received maternal sensitivity training during early infancy had children with fewer problem behaviors at school compared to peers whose mothers did not receive the sensitivity training. Importantly, this intervention yielded relatively long-term effects spanning over 4 years. Similarly, Van Zeijl and colleagues (2006) found similar results focusing specifically on training sensitive discipline.

Compliance with maternal requests reflect well-regulated behavior, whereas non-compliance and defiance reflect dysregulated behavior, and the latter is associated behavior problems also believed to reflect difficulties with emotion regulation (Lickenbrock et al., 2013). The associations between maternal sensitivity and toddler compliance has been less examined in the literature compared to other constructs discussed in this review, yet the available evidence suggests that there are some links between maternal sensitivity and compliance behaviors. Specifically, Dong, Liang, Zhang, and Wang, (2017) found that maternal sensitivity promoted

committed compliance (i.e., infants completely engaging in maternal demands) at 2 years old. Further, researchers have examined the differences between child compliance to "do" and "don't" commands and found that sensitivity at 16-months was associated with compliance with both types of demands when infants were 22-months, but maternal intrusiveness was only negatively associated with committed compliance for "don't" commands (Van der Mark, Bakermans-Kranenburg, van IJzendoorn, 2002). Taken together, these results suggest that maternal sensitivity promotes infant compliance with demands, thus children that are used to receiving insensitive and intrusive caregiving may be higher in defiance and dysregulation.

MODERATING EFFECT OF INFANT NEGATIVE EMOTIONALITY

Importantly, researchers have examined the moderating effects of infant negative emotionality on the associations between parenting and emotion dysregulation because children higher in negative emotionality may be more susceptible to develop emotion dysregulation when they receive less sensitive caregiving (Belsky, 1997; Leerkes et al., 2009). Consistent with theory, researchers have demonstrated that sensitivity to distress is critical for infants and children higher in negative emotionality (e.g., see Slagt, Dubas, Dekovic, & van Aken, 2016 for a meta-analysis). Specifically, infants higher in negative emotionality benefited most from sensitive caregiving in terms of displaying lower internalizing and externalizing behavior problems (Slagt et al., 2016). The association between sensitivity and lower behavior problems was stronger for infants that were higher in negative emotionality. Additionally, Leerkes et al. (2009) found that infant negative emotionality was a significant moderator of the association between maternal sensitivity to distress at 6-months and infant affect dysregulation at 2- and 3-years of age during a clean-up task. Specifically, maternal sensitivity to distress predicted lower affect dysregulation for infant high in temperamental reactivity but not for those low in temperamental reactivity. In addition to providing support for the moderation of infant negative emotionality, results from Leerkes et al. (2009) also suggests that these effects may be longitudinal, meaning that earlier infant negative emotionality and maternal sensitivity can have significant effects on later social and emotional adjustment.

Direct effects

Maternal characteristics, such as emotion and emotion related processes, transmit to children via many possible pathways. First, there are direct associations between maternal and children's emotional processes. Certainly, there has been ample work that has demonstrated that there is a direct association between mothers' and children's emotion regulation. Bridgett, Burt, Edwards, and Deater-Deckard (2015) examined 24 studies that examined the associations between mother and child emotion regulation across children's developmental ages. In infancy and early toddlerhood, they found that generally studies reported that there were significant associations between maternal and infant emotion regulation, such that maternal dysregulation was associated with infant dysregulation. Studies that used self-report methods of assessing maternal and infant regulation (e.g., Bridgett et al., 2011) found stronger support compared to studies that examined physiological transmission. Of the three studies that have examined physiological transmission of emotion regulation, only one showed support for longitudinal transmission of emotion regulation (Bornstein & Suess, 2000), reporting positive association between maternal and infant vagal tone when infants were 2 months and again when infants were 5 years of age. Two studies (i.e., Moore et al., 2009; Perlman, Camras, & Pelphrey, 2008) did not show such support.

Additionally, Ostlund et al. (2019) examined the transmission of maternal emotion dysregulation in pregnant mothers to their newborn infants. Specifically, they found that mothers higher in difficulty with emotion regulation during pregnancy had infants with blunted arousal and attention during their neurological examination. Although the attention finding was consistent with hypotheses, the negative association between maternal emotion dysregulation and infant arousal was surprising. It is possible that maternal emotion dysregulation in the prenatal environment may prime the infants to be prepared for experiencing dysregulation (Ostlund et al. 2019). However, they also found that maternal physiological dysregulation during a cry paradigm was associated with her own infants' arousal during the neonatal assessment.

Further, Leerkes et al. (2017) found that physiologically dysregulated mothers (higher SCL arousal, lower RSA regulation) had children with higher behavior problems, and this effect was not mediated by sensitivity to distress. Leerkes et al. (2017) provide several possible explanations for why this may be the case. Most importantly for the current study, maternal dysregulation may be conveyed to children and amp up their own distress, thus undermining the development of adaptive emotion regulation. Children can see, feel, and hear their parents' emotions and this can affect their outcomes, potentially, over and above the effects of parenting (Moore, 2009). Findings reinforce Keenan's (2000) theory that regulation and dysregulation systems may have differential antecedents and consequences. This study provides evidence for the direct link between maternal felt emotions and toddler emotion dysregulation; however, possible mechanisms of transmission are not examined. Additionally, the extant literature is missing the distinction between maternal global emotionality and maternal parenting-specific emotional responses. It is possible that these two types of felt emotions transmit to children's emotion dysregulation differently.

Indirect effects via sensitivity to distress

Higher maternal global negative emotionality or higher mother-oriented emotion during times of infant distress may be indicative of maternal emotion dysregulation. Thus, the parenting context may just be a mechanism by which emotion dysregulation is transmitted. Researchers that have examined the indirect effect of parenting on the association between mother and child emotion dysregulation has shown support for partial mediation. Specifically, these studies have shown that mothers with higher emotion dysregulation are higher in insensitive and harsh parenting, and that this is then associated with children's heightened emotion dysregulation (Bridgett et al., 2015; Li, Li, Wu, & Wang, 2019). However, this has been less explored in infancy (Mills-Koonce et al., 2009).

Identifying Covariates

Psychopathology plays a role in undermining positive parenting practices. There has been ample research on the negative effect of parental depressive symptoms on parenting throughout development. Generally, mothers higher in depressive symptoms are less likely to engage with their infant and are less responsive to infant cues (Jones, Field, Hart, Lundy, & Davalos, 2001). In addition, researchers have examined indirect effects via cognitive and emotional mechanisms. For example, Coyne et al. (2007) found that maternal depressive symptoms were associated with lower levels of parent-related empathy, which was in turn associated with lower quality parenting. Further, maternal depressive symptoms may influence parenting specific emotions. Dix and colleagues (Dix, Gershoff, Meunier, & Miller, 2004) found that maternal depressive symptoms were associated with decreases in child-oriented emotion during a parenting context, which was associated with less supportive parenting. Leerkes (2010) found that maternal depressive symptoms were associated with less sensitivity. These findings are not surprising given that depressive symptoms are associated with an increased focus on the self and lower levels of empathy generally. Additionally, it is likely that elevated maternal depressive symptoms also affect responses to maternal self-report questionnaires. Specifically, when asked about experiences with their children, mothers with elevated depressive symptoms, may be more likely to focus more on negative experiences rather than the positive interactions they have with their children (Coyne et al., 2007). Conceptually, there are likely overlapping effects of maternal depressive symptoms and maternal global negative emotionality. Controlling for depressive symptoms will help to ensure that I am capturing effects of global, stable emotional traits, rather than temporary mood problems. Thus, in the current study, the effects of depressive symptoms on parenting-specific emotions and sensitivity to distress, assessed concurrently, will be controlled.

It is possible that parental race may be an important factor to consider when understanding the role emotion plays in parenting. With a few exceptions (Leerkes et al., 2016; Lorber, 2012; Nelson et al., 2012) samples were predominantly European American and upper-middle class. Researchers have shown that outside of the parenting context, emotion has

different consequences for African Americans than for European Americans. In particular, African Americans are socialized to suppress negative emotions to protect themselves from the racist systems that dominate our society (Thomas, Coard, Stevenson, Bentley, & Zamel, 2009). Dunbar and colleagues (2017) hypothesized a model that integrated the roles that emotion and racial socialization play in African American families and how those socialization processes affect child developmental outcomes. This theoretical model can also shed light onto the potential effect that maternal felt emotions may play with racial socialization. However, less clear is the age at which these processes have effects on children's outcomes, and until this is clear in the literature, research should consider the possibility that maternal race functions as a moderator before considering race as a covariate. It is not surprising that more research on the role of race and emotion is needed due to the overwhelming homogeneity of most samples in which the role of emotion in parenting and child outcomes has been examined. In the current study, maternal race will first be examined as a moderator of the model. Importantly, this will shed light on possible process-level differences between Black and White mothers. For instance, maternal negative emotionality may be important for predicting parenting for White mothers but may not have the same negative effect for Black mothers. This method of examining moderation of the whole path is superior to simply controlling for mean level differences. However, in the current study, if the moderation is nonsignificant, then maternal race will be entered as a control variable if deemed important by the pattern of simply correlations among variables.

Factors like SES may influence emotional processing due to increases in stress in the environment (Baker, Heller, & Henker, 2000). Thus, parents' typical range of expressed emotion may be suppressed or amplified based on SES and environmental stress. Additionally, children's emotion regulation may be impacted by family SES. For example, mothers experiencing lower SES (indexed by being single, lower levels of education, a family income-to-needs ratio of less than 1.5 and having 4 or more children in the home) was associated with less warmth and responsiveness (Lanza, Rhoades, Greenberg, & Cox, 2011). Thus, in the current study, maternal SES at the prenatal assessment will be included as a covariate.

The Current Study

In sum, the links between maternal global emotionality and parenting-specific emotionality are unclear. Mothers higher in global negativity are more likely to be less sensitive and responsive toward their infants, but the mechanisms by which this transmits to these parenting behaviors are less clear. In the current study, I examined the degree to which maternal global emotionality is associated with parenting-specific emotion responses. Further, I tested the role that both global and parenting-specific emotions play in predicting later maternal sensitivity to distress and subsequent emotion dysregulation in toddlers, controlling for the effects of maternal depressive symptoms. In order to address the following questions, I drew from a sample of 259 primiparous mothers and their infants from a four wave, prospective longitudinal study designed to assess predictors of caregiving and how maternal sensitivity is associated with later child outcomes. During the third trimester, mothers completed questionnaires, and then after their infants were born, mother and infant dyads participated in recorded laboratory sessions when infants were 6, 14, and 26 months of age. At each wave, mothers completed questionnaires about themselves, their home, and their infants.

Specific methods are detailed below. Maternal global emotionality was assessed during the third trimester via maternal report. Parenting-specific emotions were assessed when infants were 6-months old via maternal report. Infant distress in the moment was assessed when infants were 14-months old via observational coding. Sensitivity to distress was assessed when infants were 14-months old using a multi-method approach of observed parenting and maternal report of parenting. Infant negative emotionality was assessed when infants were 6- and 14-months old via maternal report; maternal report at each time point were averaged together to create a longitudinal composite of maternal report of infant negative emotionality. Emotion dysregulation was assessed when infants were 26-months old using a multi-method approach of observed toddler behavior and maternal report of behavior problems.

I aimed to address the four following research questions and hypotheses:

Research Question 1

Does maternal global emotionality predict parenting-specific emotional responses?

Hypothesis 1a

Higher prenatal maternal negative emotionality will be associated with higher levels of mother-oriented parenting-specific emotions and lower levels of infant-oriented parenting-specific emotions when infants are 6-months old.

Hypothesis 1b

Higher prenatal maternal positive emotionality will be associated with higher levels of infant-oriented parenting-specific emotions and lower levels of mother-oriented parenting-specific emotions when infants are 6-months old.

Research Question 2

Do prenatal maternal global negative and positive emotionality predict sensitivity to distress when infants are 14-months old in part via parenting-specific emotional responses when infants are 6-months old? And do parenting-specific emotions assessed at 6 months moderate the concurrent association between observed infant distress and maternal sensitivity at 14 months?

Hypothesis 2a

Higher mother-oriented emotions and lower infant-oriented emotions when infants are 6-months old will be associated with less sensitive caregiving when infants are 14-months old.

Hypothesis 2b

Higher prenatal maternal negative emotionality and lower maternal positive emotionality will be associated with less sensitive caregiving when infants are 14-months old, in part, through

their effects on maternal parenting-specific emotionality when infants are 6-months old (i.e., mother-oriented and infant-oriented emotional reactions to crying).

Hypothesis 2c

Parenting-specific emotions when infants are 6-months will moderate the association between infant distress in the moment and sensitivity to distress when infants are 14-months. Specifically, the negative association between infant distress and sensitivity to distress will be stronger among mothers higher in mother-oriented emotions and lower in infant-oriented emotions. In other words, mother-oriented emotions in response to crying will exacerbate the negative association between infant distress in the moment and maternal sensitivity to distress and infant-oriented emotions in response to crying will buffer this negative association.

Research Question 3

Do prenatal maternal global negative and positive emotionality and parenting-specific emotions when infants are 6-months old predict toddlers' emotion dysregulation when toddlers are 26-months old via their effects on parenting when infants are 14-months old?

Hypothesis 3a

Higher maternal sensitivity to distress when infants at 14-months old will be associated with lower child emotion dysregulation when toddlers are 26-months old.

Hypothesis 3b

Higher prenatal maternal negative emotionality and low maternal positive emotionality will be associated with higher child emotion dysregulation when children are 26-months old, in part through effects on infant and mother-oriented responses to crying when infants are 6-months old and sensitivity to distress when infants are 14-months old.

RESEARCH QUESTION 4

What is the role of infant negative emotionality in relation to maternal sensitivity to distress and toddler emotion dysregulation?

Hypothesis 4

Infant negative emotionality (i.e., composite of 6- and 14-months) will moderate the association between sensitivity to distress at 14-months and toddler emotion dysregulation at 26-months. Specifically, for infants higher in negative emotionality at 14-months, there will be a stronger negative association between sensitivity to distress at 14-months and toddler emotion dysregulation at 26-months compared to infants lower in negative emotionality. If this is the case, the above described indirect effects may be conditional, such that the indirect effects of maternal emotions on toddler emotion dysregulation via sensitivity to distress may be stronger in dyads in which infants are higher in negative emotionality compared to dyads in which infants are lower in negative emotionality.

CHAPTER IV: METHOD

Data for the current study come from the Triad Child Study (TCS). TCS is a multimethod longitudinal study that examined primiparous mothers from the third trimester through when toddlers are 26-months old. TCS data comes from multiple sources, including mothers' report of characteristics of themselves, their families, and their infants, physiological measures of infant and mother, and observationally coded mother and infant behavior. In the current study, I utilized mother-report of global emotionality, mother-report of parenting-specific emotions, a reflective latent variable of sensitivity to distress comprised of mother-reported supportive and non-supportive responses to infant distress and observationally coded maternal sensitivity, and a reflective latent variable of toddlers' emotion dysregulation comprised of varying mother-report and observed toddler behavior. Further, infant negative emotionality will be a manifest variable reflecting mother-report of infant temperament. Observed infant distress will also be a manifest variable. Utilizing a mix of mother-report and observationally coded variables reduces reporter bias (Morris, Robinson, & Eisenberg, 2009). Maternal race will be tested as a moderator of the entire model using multigroup analyses. Maternal indicators of SES (i.e., maternal education and household income-to-needs), maternal age, and maternal depressive symptoms will be entered as covariates at each wave. SES and age will be treated as time-invariant and maternal depressive symptoms will be time variant. A summary table with all measures and constructs is provided (Table 1).

Participants

Participants came from the Triad Child Study, a longitudinal study that examined the predictors of maternal sensitivity across the transition to parenthood and into early infancy and toddlerhood. Pregnant mothers were recruited via childbirth education courses, breastfeeding courses, word-of-mouth from previous participants, and at local obstetric practices. Women were eligible to participate if they were: 18 years or older, identified as either African American or European American, fluent in English, and expecting their first child.

Participants included primiparous mothers and infants at four times. The first (N = 259), occurred during the mother's third trimester of pregnancy. The remaining three waves occurred when infants were 6- (n = 230), 14- (n = 227), and 26-months (n = 214) of age. At the prenatal time, mother age ranged from 18 to 44 (M = 25.1, SD = 5.4). Twenty seven percent of mothers reported a high school education or less, 27% reported that they attended some college, and 46% had at least an associate's degree. Most mothers, 71%, were living with their infants' father whether married or cohabitating, 11% were dating but not living with their child's father, and 18% were single or not living with their child's father. The median income was $35,000, with incomes ranging from less than $10,000 annually (15%), between $10,000 and $24,999 (19%), between $25,000 and $59,999 (32%), between $60,000 and $99,999 (21%), and $100,000 or more (5%). Mothers were either Black (n = 131) or White (n = 128). In this sample, Black women were purposefully oversampled in order to make comparisons between groups.

Participants were primarily from Guilford County, North Carolina. Data were first collected starting in late 2009/early 2010. According to the U.S. Census Bureau (2011), during this time, in Guilford County, 34% of residents had a high school education or less, 29% of residents attended some college or have an associate's degree, 23% have a bachelor's degree, and 13% have a graduate degree. Overall, the TCS participants were less educated than the population of Guilford County. In 2010, 40% of women in Guilford County were married, 20% were widowed or divorced, 3% were separated, and 37% were never married. It is difficult to draw conclusions on generalizability from the TCS sample to Guilford County, given that data on cohabitation are not available. At the time of data collection, the population of Guilford County was 57% White, 33% Black, 4% Asian, 1% Native American or Alaska Native, and 4% other race.

At 6-months, infant age ranged from 5.02 to 9.51 months (M = 6.32, SD = 0.72). Forty-eight of the original sample of 259 did not participate in the observation. Of these, 19 completed questionnaires. At 14-months, infants ranged from 11.87 to 18.33 months (M = 13.70, SD = 0.96). Of the original 259 mothers, 208 mothers completed questionnaires and the observation and 19 only completed questionnaires. At 26-months, infants ranged from 24.13 to 45.41 months

(*M* = 26.87, *SD* = 2.48). Of the original 259 participants at wave 1, 199 completed questionnaires and the observation and 15 opted to only complete questionnaires at this phase. Of the 259 mothers that participated at the prenatal phase, 173 completed all three follow-up assessments (i.e., questionnaires and laboratory session), 40 participated in two assessments, 19 participated in only one assessment, and 27 did not participate in any of the follow-up assessments. Reasons for attrition/missing data include infant mortality (two), six formal withdraws from the study, and an inability to reach participants or that they did not follow through with data collection despite multiple contacts.

There was a positive association between the number of waves completed and maternal age ($r = .15$, $p < .05$) and education ($r = .17$, $p < .01$), such that mothers that completed more waves were older and more educated. There were not significant associations between number of visits completed and maternal race, marital status, income-to-needs ratio, or experience with infants. ANOVAs were conducted to determine if there were differences that varied based on how many assessments were completed. Consistent with correlations, the omnibus ANOVA revealed significant group differences for maternal age, $F(3, 257) = 5.88$, $p < .01$, and education, $F(3, 256) = 6.39$, $p < .001$. Follow-up analyses revealed that mothers that completed 3 waves of data collection were older and reported higher levels of education compared to mothers that only completed two assessments. Dyads were included in the analyses if mothers had any data from the prenatal wave (Acock, 2005). Thus, the analytic sample is $N = 259$.

Procedures

Mothers that were recruited were scheduled for a visit six to eight weeks before their due date. Before their appointment, mothers completed questionnaires to provide demographic information and information about their global emotionality and provided written consent.

When infants were about 6 months old, mothers and infants participated in a video-taped session in a laboratory. Mother and infants participated in three distress-eliciting tasks. First, mothers and infants participated in a gentle arm-restraint. A trained experimenter kneeled in front of the infant and gently held the infant's arms still for four minutes. For the first minute,

mothers were instructed to remain uninvolved and keep a neutral face. After the first minute, mothers were allowed to be involved anyway that they wanted without removing the infant from the seat. Second, mothers and infants participated in a novel toy approach in which a remote-controlled toy truck was placed in front of the infant on a table. For four minutes, the truck moved back and forth toward the infant, lit up, and made noise. During the first minute, mothers were instructed to remain uninvolved, but were allowed to interact with the infant anyway they wanted for the remaining three minutes, except for moving the truck or taking the infants out of the seat. Third, mothers and infants participated in the Still-Face Paradigm (SFP; Tronick et al., 1979). The SFP consists of three episodes, each lasting two minutes: engage, still-face, and re-engage. During the engage episode, mothers were instructed to use their own face and body (i.e., no toys) to play with her infant for two minutes. During the still-face episode, mothers were instructed to sit back in their chair with a blank face and not interact with the infant for two minutes. During the re-engage episode, mothers were instructed to interact with their infant however they wanted without using toys for two minutes. For all three tasks, experimenters would end the task early if infants were extremely distressed for thirty continuous seconds, or if the mother indicated that she wanted to move on. Less than 3 percent of tasks were ended early due to mother or experimenter ending early. Mothers also completed questionnaires, including assessments of parenting-specific emotionality and infant temperament prior to the visit.

When infants were about 14 months old, mothers and infants participated in another video-recorded laboratory session. Mothers and infants participated in two distress-eliciting tasks. First, experimenters administered a toy removal task designed to elicit frustration. Infants were given an attractive toy phone. Once infants were engaged with the phone, the experimenter gently removed the phone from the infant and placed it in a plastic jar that the infant was unable to open. For four minutes, the experimenter prompted the infant to open the jar and answer the phone. For the first minute, mothers were instructed to remain uninvolved. An assistant experimenter in a neighboring room knocked on the window after 1 minute, signaling that the mother could get involved for the remaining three minutes. Mothers could interact in any way they wanted except removing the phone from the jar. Second, mothers and infants participated in a novel character task designed to elicit fear. An assistant dressed as an ogre entered the room

and stood quietly in the corner for thirty seconds before talking to the infant, dancing, and approaching the infant. Character movements were designed to be unpredictable to the infant. Mothers were instructed to remain uninvolved for the first minute but were signaled by a knock on the window to get involved for the remaining three minutes. Mothers could interact any way they wanted expect for touching or talking to the ogre. Both tasks were ended early if the infant was extremely distressed for 30 continuous seconds or if the mother indicated that she wanted to move on. Less than 2 percent of tasks were ended early. Mothers also completed questionnaires, including assessments of emotion socialization and infant temperament.

When infants were about 26 months old, mothers and infants participated in a third video-recorded laboratory session. Mothers and infants participated in a 7-minute free-play task with a basket of toys. At the end of seven minutes, an experimenter entered the room and handed the mother two empty containers and instructed the mother to get their child to clean up the toys. The experimenter told mothers that they could accomplish the task anyway they wanted, but they needed to involve the child. The clean-up portion of the task lasted up to five minutes. Mothers and infants also participated in a frustration task where infants were shown two toys and told to pick their favorite. After one minute of engaging with the toy, the experimenter took the toy and placed it in a clear plastic box with a lock. The experimenter showed infants how to unlock the box, and then handed infants a set of keys that did not work with the lock. Infants were prompted by the experimenter to use the keys to open the box for four minutes. For the first minute, mothers were instructed to remain uninvolved. After the first minute, mothers could be involved anyway they wanted without interfering with the task. Mothers also completed questionnaires, including assessments of their child's behavioral problems and temperament prior to the visit. All procedures were approved by the University of North Carolina Greensboro Internal Review Board (Triad Child Study; Protocol # 09-0035).

Measures

The current study draws from four waves of data collection: prenatally during the third trimester, infants age 6-months, 14-, and 26-months. All measures are summarized in Table 1.

Global maternal emotionality was assessed prenatally, parenting-specific emotions were assessed at 6 months postpartum, maternal sensitivity to distress and observed infant distress were assessed at 14 months postpartum, maternal-reported infant negative emotionality was assessed at 6 and 14 months postpartum, and toddlers' emotion dysregulation was assessed at 26 months postpartum. Key demographics were assessed prenatally, and maternal depressive symptoms were assessed at each timepoint. Given the racial composition of this sample, all maternal-report measures were subject to measurement invariance testing and items that contributed to configural and metric non-invariance were removed, and details on measurement invariance testing are provided in Appendix B. Observational measures were not subjected to measurement invariance testing.

Maternal Global Emotionality (Prenatal)

Maternal global emotionality was assessed via a maternal self-report of the Differential Emotions Scale (DES; Izard, Libero, Putnam, & Haynes, 1993). The DES contains 36 items and is designed to assess how often respondents feel discrete categories of emotions in their daily life (e.g., feel sheepish, like you don't want to be seen; feel like screaming at somebody or banging on something). Participants responded on a 5-point Likert scale from 1 (*rarely*) to 5 (*very often*). Discrete emotions assessed include interest, joy, surprise, disgust, contempt, hostility, fear, sadness, shame, anger, shyness, and guilt. In the current study, I used the two summary scores of positive emotionality (i.e., interest, joy, and surprise) and negative emotionality (i.e., disgust, contempt, hostility, fear, sadness, shame, anger, shyness, and guilt). After measurement invariance testing, the positivity score had 9 items ($\alpha = .70$) and the negativity score had 27 items ($\alpha = .91$). Final summary scores for maternal global positive and maternal global negative emotionality were created by averaging the remaining items. Two manifest variables, one of maternal global positive emotionality and one of maternal global negative emotionality, were used in the model.

Parenting-Specific Emotionality (6-months)

Parenting-specific emotionality was assessed when infants were 6-months old via the My Emotions Questionnaire (MEQ; Leerkes & Qu, 2020). The MEQ contained 17 items that reflected emotional states that mothers felt when their infants were distressed (e.g., When my baby cries, I feel sad for my baby; when my baby cries, I feel like laughing). Responses ranged from 1 (*never*) to 5 (*always*). The items loaded onto five subscales: amused (3 items; e.g., When my baby cries, I feel like laughing), self-oriented anxiety (4 items; e.g., When my baby cries, I feel nervous that I won't know how to respond), annoyance/frustration at infant (4 items; e.g., I feel frustrated with my infant for not calming down), sympathy (3 items; e.g., I feel worried for my infant – about what my infant might want or need), and empathy (3 items; I feel a strong desire to make my infant feel better). I intended to create two summary scores: mother-oriented emotions (i.e., mean of self-oriented anxiety and annoyance/frustration at infant, 8 possible items) and infant-oriented emotions (i.e., mean of sympathy and empathy, 6 possible items). The amused subscale was not used in the current study. After measurement invariance testing, there were six mother-oriented items ($\alpha = .81$) and three infant-oriented items ($\alpha = .61$) remaining. Although the adjusted α for infant-oriented parenting-specific emotion is lower than general acceptable guidelines, the scale construction is invariant between Black and White mothers, which is a priority in the current study (Green & Hershberger, 2000). Additionally, this is not unexpected given that the mother-oriented emotions scale contained just three items (Furr & Bacharch, 2008). Manifest variables of mother-oriented and infant-oriented parenting-specific emotions were used in the model.

Infant Negative Emotionality (6- and 14-months)

Mothers completed the IBQ-VSF (Putnam, Helbig, Gartstein, Rothbart, & Leerkes, 2014). Items from the negative emotionality score were used (12 items). Mothers rated the extent to which their children engaged in behaviors reflecting negative emotionality during the last week on a 7-point scale, 1 (*never*) to 7 (*always*) (e.g., When tired, how often does your baby show distress?). Previous work with this sample has demonstrated that the IBQ-VSF has metric

invariance both over time and across racial groups (Leerkes, Su et al., 2017). Cronbach's α for the negative emotionality scale were satisfactory at both 6- (α = .74) and 14-months (α = .82). The 6-month and 14-month infant negative emotionality scores were averaged together to create a composite manifest variable that was used in the model.

Maternal Sensitivity to Distress (14-months)

Sensitive and responsive parenting was assessed via observational coding of maternal sensitivity during distress-eliciting tasks and a maternal self-report questionnaire of emotion socialization practices. Maternal sensitivity was rated separately for each of the distress tasks at 14-months (i.e., toy removal and novel character approach) using Ainsworth's 9-point sensitivity scale (Ainsworth et al., 1974). This scale assesses the degree to which mothers read and respond to infants' cues in a responsive, appropriate, and warm manner. This scale ranged from possible scores of 1 (highly insensitive) to 9 (highly sensitive). Coders were trained on the scale, and 34 videos were double coded for establishing reliability, ICC = .83 for toy removal and .88 for novel character approach.

Mothers also completed the Coping with Toddlers' Negative Emotions Scale (CTNES; Spinrad, Eisenberg, Kupfer, Gaertner, & Michalik, 2004) when infants were 14 months old. The CTNES is designed to assess maternal responses to hypothetical situations in which a toddler is upset or distressed. Mothers were presented with 12 hypothetical situations (e.g., If my child is afraid of going to the doctor or of getting shots and becomes quite shaky and teary, I would…) and 6 items assessing possible maternal responses. Mothers responded to each item on a 7-point Likert scale from 1 (very unlikely) to 7 (very likely). Items map onto 6 subscales, including distress reactions (12 items, e.g., …feel upset or uncomfortable because of my child's reactions), punitive responses (12 items, e.g., …tell my child that he won't get to go something else enjoyable, such as going to the playground or getting a special snack, if he doesn't stop behaving that way), minimizing responses (12 items, e.g., …tell him that it's nothing to get upset about), expressive encouragement (12 items, e.g., …tell my child that it's okay to be upset), emotion-focused reactions (12 items, e.g., …distract my child by playing and talking about all of the fun

he will have with the sitter), and problem-focused reactions (12 items, e.g., …help my child think of things to do that will make it less stressful, like calling him in the afternoon).

The current study will use the same CTNES variable construction as that in Leerkes, Bailes, and Augustine (2020; see Appendix B for measurement invariance information). After measurement invariance testing, the emotion-focused scale had 12 items (α = .83), expressive encouragement scale had 11 items (α = .92), problem focused had 10 items (α = .84), distress response had 10 invariant (α = .81), punitive response had 10 items (α = .78) and minimizing response scale had 11 items (α = .83). Expressive encouragement, problem focused, and emotion-focused subscales were averaged to create a supportive emotion socialization summary score. Distress response, punitive, and minimizing subscales were averaged to create a non-supportive emotion socialization summary score.

Observed maternal sensitivity to distress, maternal report of supportive emotion socialization, and maternal report of non-supportive emotion socialization will be manifest indicators in the maternal sensitivity to distress reflective latent variable. It is expected that maternal sensitivity to distress and maternal report of supportive emotion socialization will have positive coefficients and that non-supportive emotion socialization will have a negative coefficient.

Observed Infant Distress (14-months)

The role of infant temperament was included at wave 3, given the strong association between concurrent infant distress and parenting behaviors that has been established in previous work using this sample. Reliability was assessed by double coding 30 cases (weighted κ = .75). Possible scores ranged from 1 (*high positive affect*) to 7 (*high negative affect*). Mean affect scores were calculated across the phone task and novel character task, with higher scores representing more negative affect. In total, 91% of infants engaged in negative affect for at least some portion of the distress tasks. Mean duration of distress was brief, about 64 seconds across both tasks (*SD* = 68.09).

TODDLERS' EMOTION DYSREGULATION (26-MONTHS)

Emotion dysregulation was assessed via maternal report of toddlers' behavior in daily life and observational coding of children's behavior during challenging laboratory tasks. Each of the following measures was used in a reflective latent variable of emotion dysregulation.

Externalizing behavior problems

Externalizing behavior problems were assessed via maternal report on the Brief Infant-Toddler Social and Emotional Assessment (BITSEA; Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2004). The BITSEA is a 42-item questionnaire designed to assess behavioral problems in infants and toddlers. Mothers respond to items such as "My child hits, shoves, kicks, or bites children," on a 3-point scale from 0 (*not true/never*) to 2 (*very true/often*). The externalizing behavior problems subscale was used which contained 7 items. After measurement invariance testing, 5 items were averaged together to create an externalizing behavior problems total manifest score.

Child emotion dysregulation

Mothers also reported on their children's social and emotional dysregulation on the BITSEA. Overall, this scale consisted of 8 items on a 3-point scale. Only two items mapped onto the current study's definition of emotional dysregulation: "My child cries or has a tantrum until he or she is exhausted" and "My child often gets very upset". The other six items on the scale were consistent with social dysregulation (e.g., "My child has trouble adjusting to change") or dysregulation in other contexts (e.g., "My child has trouble falling asleep or staying asleep."), thus these were the only two items from that scale that were considered for inclusion in a larger composite. These items correlated moderately with one another ($r = .32$, $p < .001$). The two items were averaged together to create a single child emotion dysregulation score.

Effortful control

Mothers reported on their infants' effortful control via the Early Childhood Behavior Questionnaire Very Short Form (ECBQ-VSF; Putnam, Gartstein, & Rothbart, 2006). Mothers rated the extent to which their children engaged in behaviors reflecting effortful control during the last week on a 7-point scale, 1 (*never*) to 7 (*always*) (12 items; e.g., When told "no", how often did your child stop the forbidden activity?). After measurement invariance testing, there were 9 items that were averaged together to create an effortful control summary score. This single summary score was used in the latent variable of toddlers' emotion dysregulation.

Observationally coded emotion regulation

Trained coders rated infant regulation behaviors during the locked-box task. Infant behaviors were coded in 6 categories, five of which were considered to be adaptive behavior (e.g., gaze, body position). Scores of each of these behaviors reflect the percent of time that toddlers spent engaged in each behavior. In the current study, venting behavior category was used in the construction of emotion dysregulation ($\kappa = .82$). Venting behaviors included children yelling at or pushing the experimenter, being physically aggressive with the locked box, or throwing a tantrum. In total, 17% ($n = 34$) of children exhibited venting behaviors during the locked box task. Overall, the duration of venting was brief. Of those that exhibited venting behaviors, the duration ranged from .34% of the time to 7.44% of the time ($M = 1.88$, $SD = 2.00$). The brief occurrence was not unexpected given that venting is an extreme, egregious behavior. The percent time spent engaged in venting behavior was used as an indicator of the latent emotion dysregulation variable.

Observationally coded infant distress

Infant distress during the clean-up task and the locked-box task was derived from observationally coded infant affect on a 7-point scale ranging from 1 (*high positive affect*) to 7 (*high negative affect*) (adapted from Braungart-Rieker & Stifter, 1996). Reliability was assessed

by double coding 33 cases (weighted κ = .81). Percent negative affect within each task was calculated from the amount of time that infants were coded either a 5, 6, or 7 (i.e., displaying low, moderate or high negative affect). For the clean-up task, 67% of infants engaged in negative affect for at least some portion of the task. For the locked-box task, 69% of infants engaged in negative affect for at least some portion of the task. Mean duration of distress was brief, about 30 seconds (*SD* = 60 seconds) for the clean-up task and about 20 seconds (*SD* = 33 seconds) for the locked-box task. Summary scores reflecting the proportion of the time spent in negative affect (i.e., percent of seconds scored 5, 6, or 7). Higher proportions of time in distress reflect more dysregulation. The percent time spent in negative affect for the locked-box task and for the clean-up task were averaged to create a mean percent negative affect score that was used in subsequent analyses.

Observationally coded infant defiance

During the clean-up task, infant compliance to maternal commands was coded into one of 5 mutually exclusive categories (Kochanska & Aksan, 1995): committed compliance (e.g., full endorsement of maternal agenda, willingly cleans without needing to be prompted multiple times), situational compliance (e.g., acceptance of maternal agenda, needs prompting to stay on task), passive non-compliance (e.g., ignores maternal requests, but does not actively say no or become distressed), refusal/negotiation (e.g., calmly rejects maternal requests), and defiance (e.g., engages in resistant, confrontational, or rebellious behaviors; throws tantrum). Behaviors were coded second-by-second and percent time engaged in each behavior was calculated. In the current study, the percent time engaging in defiance was used (κ = .75) because it most clearly reflects dysregulated behavior. In total, 37% of infants engaged in defiance at least once. Infants that engaged in defiant behaviors ranged in duration from less than 1% of the time to 82% of the time (*M* = 18.58, *SD* = 23.58). The proportion of time spent in defiance was used as a manifest indicator, with higher scores indicating more time spent in defiance.

Emotion dysregulation configuration

A multi-method measure of emotion dysregulation was used based on mother report and direct observation of infant behavior. As is often the case in literature (e.g., Leerkes et al., 2009), many of these indices correlate modestly, yet each is believed to reflect dysregulated emotion, thus, will be included in this multi-method measure. Indicators of externalizing behavior problems, emotion dysregulation problems, reverse scored effortful control, proportion of time spent venting during the locked-box task, proportion of time spent in negative affect during the clean-up task, and the percent time spent engaged in defiant behaviors during the clean-up task were used in a reflective latent variable. In the current study, I did not expect high correlations among the manifest indicators, nor did I expect high factor loadings for all indicators. Factor loadings that were not statistically significant were removed from the latent variable formation. In running the model, only venting behaviors was non-significant, and thus, it was removed from the model.

COVARIATES

Demographics (prenatal)

Mothers completed a brief demographic form that assessed maternal race (a proposed moderator), mother age in years, the highest level of education mothers completed, household income, and number of individuals living in the household. Household income and number of individuals living at the home were used to calculate income-to-needs ratio, which reflects the total family income divided by the official poverty threshold for a family of that size. Families that have an income-to-needs ratios of less than 1 are considered to be living in poverty whereas families with income-to-needs ratios of 1 or greater are not considered to be living in poverty. Income-to-needs ratio and maternal education were moderately correlated ($r = .55$, $p < .001$) and were composited together using a *z*-score average to reflect a manifest SES variable that was to be entered as a covariate. Maternal age was to be used as a manifest covariate in the hypothesized model if deemed necessary based on preliminary correlations.

Maternal depressive symptoms (prenatal, 6-months, 14-months, and 26-months)

Maternal depressive symptoms were assessed via the Center for Epidemiological Studies – Depression scale (CES-D; Radloff, 1977) at each wave. The CES-D contains 20 items in which respondents rate the degree to which they felt a particular way (e.g., I felt depressed, I felt that others dislike me) in the previous week on a 4-pointscale from 0 (*rarely*) to 3 (*most of the time*). In this sample, the CES-D demonstrated adequate reliability (α = .87, .90, .91, and .87, respectively at each wave). Previous work with this sample has demonstrated that the prenatal CES-D is metric invariant (Leerkes et al., 2016). Further, in other samples, the CES-D has demonstrated metric invariance in Black and White adult women (Canady, Stommel, & Holzman, 2009).

CHAPTER V: RESULTS

Analytic Plan

Descriptive statistics were calculated in SPSS and bivariate correlations were examined in Mplus (Muthen & Muthen, 2018). Mplus utilizes full-information maximum likelihood (FIML) which uses all available data in estimating coefficients and minimizing bias (Acock, 2005). Variables involved in manifest interactions (i.e., mother-oriented and infant-oriented parenting-specific emotions at 6-months and observed infant distress at 14-months) were mean centered and interaction terms were calculated by multiplying the centered values of the independent variable and the moderator together (e.g., centered mother-oriented parenting-specific emotions X centered observed infant distress).

Structural equation modeling was used to address the study aims. First, a model was specified by which manifest (e.g., maternal prenatal positive and negative global emotionality, 6-month infant- and mother-oriented parenting-specific emotionality) and latent variables (i.e., maternal sensitivity to distress and toddlers' emotion dysregulation) were used (see Figure 4 for hypothesized model). Maternal sensitivity to distress at 14-months was comprised of three manifest indicators of observed maternal sensitivity and mother-reported supportive and non-supportive emotion socialization. In the original model, the covariance between the error terms of supportive and non-supportive emotion socialization was estimated to account for shared method variance. Toddlers' emotion dysregulation at 26-months was also a reflective latent variable originally comprised of six manifest indictors: observationally coded venting, percent of time spent in negative affect, and defiance and maternal report of effortful control, emotion dysregulation, and externalizing behavior problems. Covariances of error terms were estimated for BITSEA emotion dysregulation and externalizing behavior problems to account for shared method variance. In the structural model, maternal prenatal positive and negative global emotionality were each specified to predict 6-month mother-oriented and infant-oriented parenting specific emotionality, 14-month maternal sensitivity to distress, and 26-month toddler emotion dysregulation. Maternal prenatal positive and negative emotionality error terms were

specified to covary to account for shared method variance. Mother-oriented and infant-oriented emotions were specified to predict maternal sensitivity to distress at 14-months and toddlers' emotion dysregulation at 26-months. Observed infant distress at 14-months, and the two interaction terms of mother-oriented by infant distress and infant-oriented by infant distress, were specified to predict maternal sensitivity to distress at 14-months. Error terms for mother-oriented and infant-oriented emotions were specified to covary. Maternal sensitivity to distress was specified to predict toddlers' emotion dysregulation. Covariates of maternal age and SES were specified to predict 6-month mother- and infant-oriented parenting-specific emotionality, 14-month maternal sensitivity, and 26-month toddler emotion dysregulation. Concurrent maternal depressive symptomology was specified to predict variables at each wave (e.g., prenatal depressive symptoms specified to predict maternal global positivity and negativity). Model fit was evaluated using the chi-square statistic, the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA), and the standardized root mean residual (SRMR). Criteria for a "good fit" for each index is as follows: non-significant chi-square test, CFI $\geq .90$, RMSEA $< .08$, and SRMR $< .08$ (Kline, 2010). Each fit index has biases, advantages, and disadvantages, thus examining multiple indices together allows for a better evaluation of model fit.

Next, a multigroup analysis was conducted to determine if maternal race functioned as a moderator of the model or if race should be included as a covariate. If the multiple group analysis suggested that there were no differences between the constrained and freed models, then race would be entered as a covariate. If the analysis suggested that the models did differ, then path-by-path analyses would be conducted to determine where the significant differences were in the main model. After determining the role that maternal race would have in the model, the model was respecified, fit was examined, and I trimmed the model based on modification indices, removing non-significant method effects, and removing non-significant interaction terms. Significant interaction terms were probed at one standard deviation above and below the mean. This model would be used to address research questions 1, 2, and 3. The significance of indirect effects will be evaluated using bootstrapped confidence intervals (1,000 draws, 95% confidence intervals; Asparouhov & Muthen, 2010). Significant interactions on hypothesized

mediated paths were tested using conditional indirect effects to determine if the indirect effect is significant but only for a certain group (e.g., high negative emotionality group). Next, a model where infant negative emotionality at 6- and 14-months was specified to moderate the association between maternal sensitivity to distress at 14-months and toddlers' emotion dysregulation at 26-months using XWITH and analysis TYPE = RANDOM was specified. This model would be used to address research question 4.

Preliminary Analyses

Descriptive statistics, including means, standard deviations, and minimum and maximum values, are presented in Table 2. Normality of data was assessed, and outliers were examined. No outliers were identified, and the data were normally distributed. Preliminary correlations were calculated to determine covariates (Table 3). Overall, missingness was 12%. Maternal age was correlated with higher observed maternal sensitivity (r = .50, p < .001), higher maternal supportive emotion socialization (r = .15, p = .03), lower maternal non-supportive emotion socialization (r = -.24, p < .001), and lower levels of toddler mean percent negative affect (r = -.15, p = .03) and mother reported emotion dysregulation (r = -.24, p < .001). Maternal SES was correlated with higher infant- (r = .16, p = .01) and mother-oriented emotions (r = .14, p = .03), lower levels of infant negative emotionality at 6- and 14-months (r = -.24, p = .001), higher maternal sensitivity (r = .50, p < .001), higher maternal supportive emotion socialization (r = .24, p < .001), lower maternal non-supportive emotion socialization (r = -.31 p < .001), and lower levels of toddlers' defiance (r = -.19, p = .01), mean percent negative affect (r = -.21, p = .002), externalizing behavior problems (r = -.17, p = .01), and mother reported emotion dysregulation (r = -.22, p = .001). Thus, maternal age and SES were entered as covariates.

Maternal race (coded as 0 = Black and 1 = White) was correlated with infant negative emotionality 6- and 14-month composite (r = -.26, p < .001), observed maternal sensitivity (r = .48, p < .001), maternal supportive emotion socialization (r = .25, p < .001), maternal non-supportive emotion socialization (r = -.20, p = .002), externalizing behavior problems (r = -.14, p = .04), and mother-reported emotion dysregulation (r = -.25, p < .001). Maternal depressive

symptomology was included as a theoretical covariate given the expected associations between depressive symptomology and emotion processes for mothers. Prenatal depressive symptoms were correlated with higher levels of maternal global negativity (r = .66, p < .001), but were not correlated with maternal global positivity (r = -.10, p = .10). Depressive symptoms at 6-months were correlated with mother-oriented emotions (r = .30, p < .001), but not infant-oriented emotions (r = .03, p = .67). Depressive symptoms at 14-months were correlated with lower observed maternal sensitivity (r = -.17, p = .01), lower supportive emotion socialization (r = -.28, p < .001), and higher non-supportive emotion socialization (r = .20, p = .002). Depressive symptoms at 26-months were correlated with lower toddlers' effortful control (r = -.22, p = .001), higher externalizing behavior problems (r = .31, p < .001), and higher mother-reported emotion dysregulation (r = .30, p < .001). All subsequent analyses were conducted using Mplus version 8 (Muthen & Muthen, 2018).

Bivariate correlations for the manifest variables and indicators are presented in Table 3. Of relevance to the aims of the current study, prenatal maternal positive global emotionality was associated with higher levels of infant-oriented parenting-specific emotions at 6-months (r = .14, p = .03), higher levels of maternal supportive emotion socialization at 14-months (r = .20, p = .002), and higher levels of toddler effortful control at 26-months (r = .16, p = .02). Prenatal maternal negative global emotionality was associated with higher levels of mother-oriented parenting-specific emotions at 6-months (r = .23, p < .001), lower levels of toddler effortful control at 26-months (r = -.16, p = .02), and higher levels of toddler externalizing behavior problems at 26-months (r = .36 p < .001) and mother-reported emotion dysregulation (r = .23, p < .001). Infant-oriented parenting-specific emotions at 6-months were associated with higher levels of maternal supportive caregiving at 14-months (r = .14, p = .04) and higher levels of toddler effortful control at 26-months (r = .21, p = .004). Mother-oriented parenting-specific emotions at 6-months were associated with lower levels of maternal supportive emotion socialization at 14-months (r = -.15, p = .02), higher levels of maternal non-supportive emotion socialization at 14-months (r = .17, p = .01), and higher levels of toddler externalizing behavior problems a 26-months (r = .18, p = .01) and toddlers' mother-reported emotion dysregulation at 26-months (r = .26, p < .001). Observed maternal sensitivity at 14-months was marginally

associated with lower levels of toddlers' defiance (r = -.13, p = .08), venting behaviors (r = -.13, p = .03), percent negative affect (r = -.13, p = .08), and externalizing behavior problems (r = -.12, p = .08), and significantly associated with lower levels of mother-reported emotion dysregulation at 26-months (r = -.29, p < .001). Maternal supportive emotion socialization was associated with higher levels of toddler effortful control (r = .20, p = .003), lower levels of externalizing behavior problems (r = -.16, p = .02), and lower levels of mother-reported emotion dysregulation at 26-months (r = -.24, p < .001). Maternal non-supportive emotion socialization was associated with higher levels of toddler externalizing behavior problems (r = .19, p = .004) and higher levels of mother reported emotion dysregulation at 26-months (r = .23, p = .001).

Primary Analyses

The model described above was estimated using the default maximum likelihood (ML) estimator in Mplus. Factor loadings for the two latent variables were examined; maternal sensitivity showed high loadings that were all statistically significant. For emotion dysregulation, I did not expect factor loadings to be high for all indicators, and thus, criterion for inclusion in the latent variable was statistical significance. Only one indicator, venting behaviors during the locked box task, did not meet this initial criterion, and the indicator was removed from subsequent analysis. When using TYPE = RANDOM to estimate latent variable moderation, the estimator changes to MLR (maximum likelihood with robust standard errors). Thus, I also wanted to ensure that the original model had similar results when using this estimator. After running the model with MLR instead of ML, another indicator, defiance during the cleanup task, on the emotion dysregulation latent variable was not significant and was removed from subsequent analyses. Final factor loadings for maternal sensitivity to distress and toddlers' emotion dysregulation are presented in the top panel of Table 4.

A multiple group analysis was conducted on this model. First, a model was specified by which path coefficients were constrained to equality across Black and White mothers, $\chi^2(291)$ = 580.978, p < .001. A second model was specified by which structural paths were allowed to vary based on race, $\chi^2(262)$ = 541.978, p < .001. A chi-square difference test was computed, $\Delta\chi^2(29)$ =

38.162, $p = .12$, suggesting that there was not a significant improvement in model fit moving from the equal path model to the freed path model. Thus, maternal race was entered as a covariate specified to predict infant-oriented and mother-oriented emotions, maternal sensitivity to distress, and toddlers' emotion dysregulation, and the base model was reanalyzed. This model had poor fit on three of the four indicators and acceptable fit on RMSEA, $\chi^2(154) = 295.649$, $p < .001$; RMSEA = .060, 90% CI [.049, .070]; CFI = .752; SRMR = .095. A significant chi-square test was not unexpected given the large sample size. RMSEA values are typically biased toward models with higher degrees of freedom, which is present in this model. Additionally, CFI values are typically lower when models are overparameterized and there are low correlations among variables and given the magnitude and complexity of the model in the present study, this was not unexpected, although still not ideal. Modification indices did not suggest changes that warranted inclusion. Given the poor fit indices, I removed the non-significant method effects that were included in the original model, which included the supportive emotion socialization and non-supportive socialization covariance, covariance between infant-oriented and mother-oriented emotions, and the covariance between externalizing behavior problems and mother reported emotion dysregulation. Model fit for this model was still poor, $\chi^2(157) = 296.011$, $p < .001$; RMSEA = .059, 90% CI [.048, .069]; CFI = .757; SRMR = .095. I also removed the non-significant mother-oriented by observed infant distress interaction term. The model fit for the final model was still poor concerning χ^2 test and CFI, acceptable on SRMR, and good on RMSEA (Figure 5), $\chi^2(144) = 271.826$, $p < .001$; RMSEA = .059, 90% CI [.048, .069]; CFI = .771; SRMR = .098. Implications of poor model fit are discussed in the limitations section. Lastly, I estimated a model where the XWITH command was used for latent variable interaction. Specifically, maternal sensitivity to distress was specified to interact with infant negative emotionality from 6 and 14-months to predict toddlers' emotion dysregulation at 26-months (Figure 6). This interaction was not specified in the original model because when using the XWITH command, Mplus does not generate traditionally examined fit indices. Additionally, when interpreting results from this model, I only examined the effect of the interaction on toddlers' emotion dysregulation (red line in Figure 6).

All reported values are the standardized values, except for maternal race, given that it is dichotomously coded variable and standardized values for dichotomous variables do not provided interpretable information. For visual simplicity, effects of maternal race, SES, and age, and the loadings for manifest indicators on latent variables are not included in the figure but are included in the model and are presented in Table 4.

Research Question 1. Does maternal global emotionality predict parenting-specific emotional responses?

This question was addressed by examining the coefficients for maternal prenatal global positivity and negativity predicting maternal infant-oriented and mother-oriented parenting-specific emotions. Consistent with prediction, and over and above the covariates noted below, maternal prenatal global positivity was positively associated with infant-oriented parenting-specific emotions at 6-months ($\beta = .14$, $p = .04$). Maternal prenatal global positivity was negatively associated with mother-oriented parenting-specific emotions at 6-months ($\beta = .10$, $p = .56$). Maternal SES was positively associated with infant-oriented parenting-specific emotionality ($\beta = .30$, $p = .01$). Maternal age ($\beta = -.12$, $p = .16$), race ($\beta = -.13$, $p = .24$), and concurrent depressive symptoms ($\beta = .05$, $p = .47$) were not significantly associated with infant-oriented emotionality.

Maternal prenatal global negative emotionality was positively associated with mother-oriented parenting-specific emotions at 6-months ($\beta = .18$, $p = .003$). Further, maternal SES ($\beta = .19$, $p = .02$) and concurrent depressive symptoms ($\beta = .32$, $p < .001$) were positively associated with mother-oriented emotionality. The effects of maternal age ($\beta = .04$, $p = .62$) and race ($\beta = .14$, $p = .12$) on mother-oriented emotionality were not significant. The R^2 for infant-oriented emotions was .09, and the R^2 for mother-oriented emotions was .24.

RESEARCH QUESTION 2. DO PRENATAL MATERNAL GLOBAL NEGATIVE AND POSITIVE EMOTIONALITY PREDICT SENSITIVITY TO DISTRESS WHEN INFANTS ARE 14-MONTHS OLD IN PART VIA PARENTING-SPECIFIC EMOTIONAL RESPONSES WHEN INFANTS ARE 6-MONTHS OLD? AND DO PARENTING-SPECIFIC EMOTIONS ASSESSED AT 6 MONTHS MODERATE THE CONCURRENT ASSOCIATION BETWEEN OBSERVED INFANT DISTRESS AND MATERNAL SENSITIVITY AT 14 MONTHS?

To address this question, I examined the coefficients of the paths from prenatal maternal positive and negative emotionality to infant-oriented and mother-oriented parenting-specific emotions, the paths from prenatal maternal positive and negative emotionality to maternal sensitivity, and the paths from infant-oriented and mother-oriented parenting-specific emotions to maternal sensitivity. Further, I examined the indirect effects by examining the bias corrected bootstrapped confidence intervals. Moderation was tested by probing significant interactions at one standard deviation above and below the mean of infant-oriented and mother-oriented emotions and plotting.

Contrary to prediction, there were no direct effects of maternal prenatal global positivity ($\beta = .02$, $p = .81$) or negativity ($\beta = -.02$, $p = .79$) on maternal sensitivity at 14-months. Additionally, neither infant-oriented ($\beta = .12$, $p = .13$) nor mother-oriented ($\beta = -.08$, $p = .36$) parenting-specific emotions at 6-months were directly associated with maternal sensitivity at 14-months. Consistent with prediction, there was a direct effect of observed infant distress at 14-months on maternal sensitivity at 14-months, such that higher levels of observed infant distress was associated with lower levels of maternal sensitivity ($\beta = -.37$, $p < .001$). Maternal age ($\beta = .31$, $p = .001$), SES ($\beta = .27$, $p = .008$), and race ($\beta = .97$, $p < .001$) were positively associated with maternal sensitivity to distress. Concurrent maternal depressive symptoms were not significantly associated with maternal sensitivity to distress at 14-months ($\beta = -.13$, $p = .15$).

The interaction between mother-oriented parenting-specific emotions at 6-months and observed infant distress at 14-months was not significant ($\beta = -.07$, $p = .38$) and was removed from the model. In contrast, the interaction between infant-oriented emotions at 6-months and observed infant distress at 14-months was significant ($\beta = -.15$, $p = .05$; Figure 7). Simple slope analyses revealed that, contrary to prediction, the negative association between infant distress

and maternal sensitivity was stronger among mothers higher in infant-oriented emotions (β = -.55, $p < .001$) compared to mothers lower in infant-oriented emotions (β = -.20, $p = .05$). The R^2 for maternal sensitivity was .77, suggesting that much of the variance in the variable was explained by the model.

Research Question 3. Do prenatal maternal global negative and positive emotionality and parenting-specific emotions when infants are 6-months old predict toddlers' emotion dysregulation when toddlers are 26-months old via their effects on parenting when infants are 14-months old?

To address this question, I examined the coefficients of the paths from prenatal maternal positive and negative emotionality to infant-oriented and mother-oriented parenting-specific emotions to maternal sensitivity at 14-months to toddlers' emotion dysregulation at 26-months. Further, I examined the indirect effects by examining the bias corrected bootstrapped confidence intervals.

Neither maternal global prenatal positivity (β = -.04, $p = .61$) nor infant-oriented emotions (β = -.02, $p = .83$) were associated with toddler's emotion dysregulation at 26-months. In contrast, maternal global prenatal negativity (β = .25, $p = .01$) and mother-oriented emotions (β = .23, $p = .03$) at 6-months were positively associated with toddlers' emotion dysregulation at 26-months. Given the significant effect of maternal global negativity on mother-oriented parenting specific emotions, the indirect effect from maternal global negativity to mother-oriented emotions to toddlers' emotion dysregulation was examined. The confidence intervals were examined, and the indirect effect was not significant, β = .04, $p = .08$, 95% CI [-.003, .115]. Contrary to prediction, the effect from maternal sensitivity to distress at 14-months to toddlers' emotion dysregulation at 26-months was not statistically significant (β = -.19, $p = .41$). Thus, there were no possible indirect paths via sensitivity that warranted evaluation. In terms of identified covariates, concurrent depressive symptoms were positively associated with toddlers' emotion dysregulation (β = .20, $p = .04$). Maternal age (β = .01, $p = .96$), SES (β = -.06, $p = .67$), and race (β = -.07, $p = .65$) were not significantly associated with toddlers' emotion

dysregulation. The model accounted for 35% of the variance in emotion dysregulation ($R^2 = .35$, $p < .001$).

Research Question 4. What is the role of infant negative emotionality in relation to maternal sensitivity to distress and toddler emotion dysregulation?

To address this question, I examined the effect of the interaction between maternal sensitivity and infant negative emotionality on toddlers' emotion dysregulation that was estimated in the latent variable moderation model (Figure 6). Contrary to expectation, there was not a direct effect of infant negative emotionality in early infancy on emotion dysregulation at 26-months ($\beta = .20$, $p = .61$). Additionally, the interaction between infant negative emotionality and maternal sensitivity predicting toddlers' emotion dysregulation was not significant ($\beta = .02$, $p = .87$). The R^2 for this model was also .35, suggesting that the addition of the latent variable interaction did not explain any additional variance in emotion dysregulation.

CHAPTER VI: DISCUSSION

Mothers serve a critical function in promoting children's adaptive social and emotional outcomes. Sensitive and responsive mothers provide an environment by which children develop optimal emotion regulation skills and strategies that lay a foundation for emotion regulation throughout childhood (Cole & Hall, 2008). Thus, identifying factors that predict the quality of caregiving is critical. In particular, maternal emotionality has been demonstrated to inform parenting behaviors, but few studies have examined how global emotionality is linked with infant- and mother-oriented emotions that are felt in response to infant crying and how these factors directly and indirectly, via maternal sensitivity, predict children's emotion dysregulation outcomes. The current study aimed to address the gaps and limitations of the extant literature in four ways. First, this study examined the direct associations between maternal global emotionality, including both positive and negative emotionality, and parenting-specific emotions. Second, the current study aimed to test a pathway by which maternal global emotionality was indirectly associated with maternal sensitivity to distress via parenting-specific emotions. Third, I examined the degree to which global emotionality and parenting-specific emotions predicted toddlers' emotion dysregulation via maternal sensitivity. Finally, in the current study, I tested the degree to which infant negative emotionality moderated the association between maternal sensitivity and toddlers' emotion dysregulation. Additionally, given the racial composition of this sample and known differences in emotion and parenting processes and their effects on child outcomes in research with older children, in the current study, I considered the role of race as a moderator of the structural model. Results from the multiple group analysis revealed that maternal race did not moderate any of the structural paths. That is, no group level process differences were apparent. However, race was associated with many key variables indicating mean level differences, and thus, race was included as a covariate of the model in subsequent analyses. Results, implications, and strengths and limitations of the current study are discussed.

Effects of Maternal Global Emotionality on Parenting-Specific Emotions (RQ1)

Consistent with prior theory (Leerkes & Augustine, 2019) and hypotheses, global positive and negative emotionality predicted parenting specific emotions. Specifically, mothers who reported feeling higher levels of positive global emotions, including joy, happiness, and surprise, reported feeling more infant-oriented emotions, including empathy and sympathy, when infants are distressed. Mothers who are higher in global positivity may be more considerate of others and their needs, and when their infants show distress, global positivity increases the likelihood that these mothers feel empathy and sympathy toward their infants. Infant-oriented emotions reflect mothers' emotions that prioritize the infants' needs, such that they feel sad or sorry for the infant during times of distress. Likewise, mothers who reported feeling higher levels of negativity, including sadness, anger, and fear, reported feeling more mother-oriented emotions, including mother-oriented anxiety and anger, when their infants were 6-months old. Mother-oriented emotions reflect feelings of anger and anxiety at the infant rather than on the infants' behalf and reflect a prioritization of the mothers' needs over the infants when the infant is distressed. Mothers who are prone to experience more negative emotions may have a negative outlook on the world that spills over into their interactions with their infant. Results contribute to the extant literature in two important ways. First, much of the prior work examining similar associations has been completed in convenience samples of undergraduate students (Helcher et al., 2015; Lin & McFatter, 2012) or using cross-sectional data (Zeifman & St. James-Robert, 2017). This is one of the first studies to establish the associations between maternal global emotionality and later parenting-specific emotions. Second, maternal positive emotionality has been less frequently examined in the literature compared to the role of maternal negative emotionality. This was one of the first studies to examine how positive emotionality affects parenting-specific emotionality and lends credence to the view that a disposition toward positive emotionality may lead to more adaptive parenting-specific emotion. However, the model only explained 9% of the variance in infant-oriented emotions, suggesting that there may be other factors that influence the extent to which mothers feel infant-oriented emotions. This is consistent with work that suggests that infant-oriented cry processing is better predicted by in-the-moment influences rather than longitudinal predictors (Leerkes et al., 2020). On the other

hand, the model accounted for a much larger, but still small, proportion of the variance for mother-oriented emotions (24%).

Maternal Emotionality and Maternal Sensitivity (RQ2)

Contrary to hypotheses and inconsistent with prior theory (Dix, 1991; Leerkes & Augustine, 2020), maternal global positivity, global negativity, infant-oriented emotions, and mother-oriented emotions were not directly associated with maternal sensitivity to distress when infants were 14-months old. I propose four possible explanations for the lack of significant findings between global emotionality and parenting-specific emotions and maternal sensitivity to distress. First, there are multiple ways to be insensitive toward infants. The bulk of research has focused on the global domain of sensitivity, similar to the current study. Some work has explored the degree to which maternal insensitive behavior is captured into two broad categories: overtly negative behaviors (e.g., intrusiveness, persistently ineffective behaviors, discipline or negativity toward child) and unresponsive behaviors (e.g., withdrawal from child, ignoring child) (Field, 2010; Gedaly & Leerkes, 2016; Schieche & Spangler, 2005). Based on the global sensitivity scale, mothers who engage in either of these types of behaviors would be scored as less sensitive, but the global scale does not distinguish between these types. It has been evidenced in previous work that overtly negative behaviors and unresponsive behaviors have different origins in maternal emotionality. For example, mothers who are more emotionally unstable and less agreeable are more likely to engage in overtly negative maternal behaviors (Bailes & Leerkes, 2021; Sellers et al., 2014). On the other hand, mothers who are higher in depressive symptomology are more likely to engage in unresponsive behaviors (Field, 2010; Norcross, Leerkes, & Zhou, 2017). Given these findings, it is possible that the non-significant effects in the current study from maternal global emotionality and parenting specific emotions to maternal sensitivity to distress may be attributed to using a global indicator of sensitivity rather than examining types of insensitive behavior. Based on findings from previous research, maternal negative emotionality and mother-oriented emotions may be more strongly associated with higher levels of overtly negative behaviors such as discipline and intrusiveness, whereas

maternal positive emotionality and infant-oriented emotions may be associated with lower levels of unresponsiveness.

Second, it is possible that rather than broad composites of global emotionality and parenting-specific emotions, discrete emotions may be more important for predicting maternal behavior and sensitivity. When considering global emotionality, maternal trait anger has been associated with aspects of caregiving, including lower maternal sensitivity (Burrous et al., 2009) and higher maternal harshness (Di Giunta et al., 2020). Other discrete emotions, such as sadness, have been associated with higher levels of maternal withdrawal (Hajal, Teti, Cole, & Ram, 2019). Importantly, in the current study, I controlled for concurrent levels of maternal depressive symptoms, and prenatal depressive symptoms were correlated strongly with global negativity, suggesting that there is a lot of overlap in those constructs. It is likely that when separating global negativity into discrete emotions, sadness and depressive symptoms will correlate even stronger. Thus, it is likely that much of the variance for negative emotionality may have been removed from the model by depressive symptoms.

Similar reasoning can be used to explain the non-significant finding from mother-oriented emotions to sensitivity. Mother-oriented emotions include mother-oriented anger and mother-oriented anxiety. Mother-oriented anger toward the infant has been demonstrated in previous literature to be associated with lower sensitivity, more reactive discipline, and less synchrony between mothers and infants (Dix et al., 2004; Leerkes et al., 2011). The effects between mother-oriented anxiety and parenting behaviors have not be established in the literature using community samples like the current study, and thus, it is possible that by keeping mother-oriented anger and anxiety together, any potentially significant effects were obscured. Research using clinical samples of general anxiety may be informative. For example, compared to mothers who did not have clinical levels of anxiety, mothers with clinical levels were lower in efficacy and satisfaction with parenting, but higher in involvement with their children and in parental warmth (Seymour, Giallo, Cooklin, & Dunning, 2014). These results suggests that in some ways, maternal anxiety is helpful in promoting positive aspects of caregiving, such as maternal warmth, but these mothers are also more likely to be intrusive in their caregiving. Mother oriented-anger

may be more important for predicting more egregious parenting behaviors such as abusive and neglectful parenting, and mother-oriented anxiety may be more important for predicting maternal withdrawal and non-responsiveness. Future research should examine the role of discrete negative emotions such as sadness and anger and parenting-specific emotions in predicting maternal sensitivity and other parenting variables.

Third, there may be methodological explanations for the non-significant effects. Previous researchers who have examined the effects of global emotionality on parenting typically focus on one aspect of parenting that is obtained from a single source: either observed or mother reported. In the current study, I drew from both observationally coded maternal sensitivity and mother-reported responses about infant distress. It may be that global emotionality is more predictive of either mother reported caregiving or observed caregiving, and these effects are obscured when larger multi-method parenting constructs are considered. Examining the simple correlations suggests this may be the case. Maternal positive global emotionality was positively correlated with supportive emotion socialization, and negative global emotionality was marginally correlated with both observationally coded sensitivity and non-supportive emotion socialization. Although I consider the multi-method composition of maternal sensitivity to be a strength of the current study, it may be contributing to results that are inconsistent with previous research.

Fourth, it is possible that the valence and orientation of emotionality interact to predict parenting (e.g., global positivity by global negativity; mother-oriented by infant-oriented). That is, mothers can vary in patterns of emotionality and these patterns may matter more so than simple main effects, a possibility supported by the near 0 associations between positive and negative emotionality (r = .03) and infant and mother-oriented emotions (r = .07). Thus, it is possible that, when considered together, these emotions tend to buffer one another or exacerbate the negative effects of another. For example, mothers' high negativity may be associated with lower levels of sensitivity if accompanied by low positive emotionality. Similarly, mothers who are higher in infant-oriented and lower in mother-oriented emotions may be more sensitive compared to mothers who are higher in both or lower in both types of emotionality. This has indeed been demonstrated in the literature concerning the role of maternal empathy and negative

emotions in response to infant distress. Specifically, one study found that maternal empathy in response to infant distress was only associated with higher levels of maternal sensitivity when mothers were also low in negative emotions (Emery, McElwain, Groh, Haydon, & Roisman, 2014). Future research should continue to explore the interaction between valence and orientation of emotion as well as taking person-centered approaches to examining the association between emotionality and caregiving behaviors.

Although I did not test the interactions between types of emotions in relation to maternal sensitivity to distress in the current study, I did test the extent to which infant-oriented and mother-oriented emotions when infants were 6-months old moderated the association between infant distress in the moment and maternal sensitivity to distress when infants were 14-months old. Higher infant distress tends to be associated with lower sensitivity in the moment (e.g., Slagt et al., 2016), and that was the case in this study as well, likely because higher levels of distress make parenting more difficult. Mother-oriented emotions did not moderate this association, but infant-oriented emotions did. I had anticipated that higher infant-oriented emotions would protect mothers from this negative effect of infant distress on maternal sensitivity. Although the interaction effect was indeed significant, the simple slopes were opposite to prediction such that infants who exhibited more distress received less sensitive caregiving, but the effect was stronger in mothers higher in infant-oriented emotions compared to lower in infant-oriented emotions. One possible explanation could be that mothers higher in infant-oriented emotions may be overcompensating during times of distress and are being more intrusive and less sensitive in their interactions with their children. Additionally, in laboratory settings when mothers know they are being observed, mothers may feel that they need to perform well and hence amp up their interactions with their infants. If this is the case, teasing apart insensitive maternal behaviors into overtly negative and unresponsive behaviors would likely suggest that infant-oriented emotions would be positively associated with overtly negative behaviors.

Further, although empathy has been demonstrated to be associated with more sensitive and responsive caregiving (Bryan & Dix, 2009; Dix et al., 2004; Leerkes et al., 2016), it is possible that too much empathy is counterproductive if it leads to emotional flooding (Del

Vecchio et al., 2016; Leerkes & Augustine, 2019). Consistent with this view, one study found that maternal empathy was only associated with higher levels of sensitivity when mothers were lower in physiological arousal (Emery et al., 2014). The fact that in the current study, infant distress more strongly predicted maternal sensitivity for mothers who were higher in infant-oriented emotions may be partially explained by mothers' emotional arousal in the moment. Infant distress increases emotional arousal, which may inhibit or override otherwise sensitivity-inducing characteristics of mothers, such as infant-oriented empathy and sympathy if this emotional arousal is not regulated adequately. This explanation of maternal emotional flooding is consistent with parenting and emotion theories that emphasize the importance of the role of both the valence and intensity of mothers' emotional experiences in relation to children's emotional distress (e.g., Dix, 1991; Leerkes & Augustine, 2019).

Research examining the role of personal distress may also shed light on these findings. Personal distress reflects an individual's feelings of alarm or concern for others, but the accompanying emotions are negative (Eisenberg & Eggum, 2009; Lin & McFatter, 2012). Unlike empathy, personal distress is not altruistic, but rather reflects a desire to alleviate the source of emotion for one's own benefit (Eisenberg et al., 1998). Personal distress is often correlated with global negativity and negative affect (Watson & Clark, 1984). Attachment scholars suggest that maternal empathy is critical for sensitive caregiving, and it has been suggested that mothers higher in personal distress may be too preoccupied with their own feelings and emotions to actively take their infants perspective in a distressing situation, impeding sensitive caregiving (Psychogiou, Daley, Thompson, & Songua-Barke, 2008). Indeed, personal distress has been found to mediate the association between maternal negativity and harsh parenting (Le, Fredman, & Feinberg, 2017). Thus, personal distress may be what is driving this counterintuitive finding between infant-oriented emotions and sensitivity. Specifically, social desirability effects may lead mothers to report on what is actually personal distress, or mother-oriented emotions, as empathy, or infant-oriented emotions.

Predicting Toddlers' Emotion Dysregulation (RQ3 and 4)

Maternal emotionality.

Neither maternal global positivity nor infant-oriented emotions were associated with toddlers' emotion dysregulation. The direct transmission of maternal positivity has not been examined in previous work, given the emphasis has been placed on the role of negative emotion, and in particular, the role of dysregulated maternal negative emotion. One explanation for the lack of findings for positive and infant-oriented emotions is that positive emotions may be more important for examining in-the-moment effects compared to longitudinal associations, and this may be particularly relevant for infant-oriented emotions. It is also possible that infant-oriented emotions may play a role in predicting concurrent emotion dysregulation rather than later dysregulation. It could also be that positive maternal characteristics, like positive emotionality and infant-oriented emotions are associated with adaptive social skills and positive aspects of child development, compared to negative, maladaptive outcomes. For example, maternal positive affect has been associated with higher levels of infant smiling and laughter (Bridgett, Laake, Gartstein, & Dorn, 2013).

Mothers who were higher in negative emotionality and mothers who were higher in mother-oriented emotions had toddlers who exhibited more dysregulated emotion at 26-months. This, was not, however, explained by maternal sensitivity as hypothesized. Although the indirect effect from maternal global negativity to toddlers' emotion dysregulation via mother-oriented emotions was not significant at 95% confidence, it was significant at 90%. The effect sizes of the associations from global negativity to mother-oriented emotions and from mother-oriented emotions to emotion dysregulation were small in magnitude, and it is possible the current study was underpowered to detect an indirect effect involving two small effect sizes. Previous work in this area had demonstrated mixed support regarding the direct effect of maternal negative emotionality to children's dysregulation, with work that utilized mother-reported emotion demonstrating stronger effects than physiological or other indicators of maternal emotion (Brdigett et al., 2015). The current study extends the findings from previous work in two

important ways. First, the current study provides more support for the direct transmission of maternal negative emotionality to children's emotion regulation outcomes. Second, the assessment and inclusion of mother-oriented parenting-specific emotions in this process is unique.

Maternal negative emotionality encompasses multiple discrete emotions, including sadness, anger, guilt, and shame. Each of these discrete emotions can serve as predictors of children's emotional development. For example, maternal trait anger has been found to predict preschoolers' emotion dysregulation, for example (Morelen, Shaffer, & Suveg, 2016) whereas maternal sadness may undermine children's emotion understanding (Halberstadt & Eason, 2002). In the current study, concurrent depressive symptoms were entered as a covariate. It is likely that much of the variance that was accounted for in sadness was likely covaried out of the model. Thus, this direct association between maternal negative emotionality and toddlers' emotion dysregulation is likely driven by other discrete emotions, such as maternal anger. Future research should consider differentiating between discrete negative emotions when examining the degree to which mothers' negative emotionality is linked with children's emotion dysregulation.

Maternal Sensitivity

Contrary to hypothesis and previous research and theory (Cassidy, 1994; Leerkes & Augustine, 2020), maternal sensitivity at 14-months was not associated with toddlers' emotion dysregulation at 26-months. Simple correlations suggested that there were many significant and trend-level correlations between indicators of maternal sensitivity to distress and indicators of emotion dysregulation, albeit small in magnitude. When taken into consideration in the full model, maternal sensitivity to distress was not associated with toddlers' later emotion dysregulation. I propose three possible explanations for the inconsistent finding. First, the current study was conducted using a community sample with average levels of risk for both mothers and children. I was interested in examining the most maladaptive dysregulation behaviors in toddlers. This is not the standard approach taken in the extant literature, particularly when working with a community sample with normative variations and ranges of risk. Typically, children who display

the most extreme dysregulated behaviors are children who have received the most egregious parenting (e.g., highly insensitive, very negative), and this type of caregiving does not occur frequently in this sample.

Second, integrating different types of insensitive maternal behavior may be more important for predicting toddlers' emotion dysregulation in this sample. Previous work has demonstrated that overtly negative and unresponsive maternal behaviors have different consequences for child outcomes. Infants who receive more overtly negative caregiving are more likely to develop attachment disorganization and internalizing behavior problems (Gedaly, & Leerkes, 2016; Norcross et al., 2017; Out, Bakermans-Kranenburg, & Van IJzendoorn, 2009), whereas infants who receive more unresponsive caregiving tend to be overly dependent on self-oriented emotion regulation (Schieche & Spangler, 2005). Focusing on types of insensitive maternal behavior could provide insight to the role that maternal behavior may have on these more egregious and extreme indicators of emotion dysregulation.

Third, emotion regulation is a complex and intricate set of skills that can reflect different domains of emotional development that operate across different systems (e.g., behavioral, physiological, and social). These different domains of emotion regulation develop in conjunction with one another, but often have different antecedents, trajectories, and consequences. Children may have competencies in one domain of emotion regulation and be lacking in another. For example, there is evidence of behavioral regulation strategies emerging earlier in development, with infants quickly learning to minimize or maximize their distress to promote proximity to their caregiver during times of need in the first year of life (Cassidy, 1994). On the other hand, physiological regulation systems, in particular vagal responses, may take more time to develop and continue to change through infancy and into toddlerhood (Calkins, Graziano, & Keane, 2007). Drawing from multiple domains of emotion regulation is a strength of the current study but can also lead to nonconvergence in conceptualization of constructs. Rather than examining these different systems using a latent variable model, future research should explore utilizing profiles of responses and behaviors across different systems. Indeed, research has explored different emotion regulation profiles in later childhood that draw from observed reports, mother

reports, child reports, and physiological arousal (Zalewski, Lengua, Wilson, Trancik, & Bazinet, 2011). Children who displayed the highest levels of dysregulation across all indicators had higher levels of conduct problems, but children who were only higher on self-reported anger in response to a challenging task were higher in depressive symptomology. Taken together, these results suggest that different domains of dysregulation may have different origins and different consequences for developmental outcomes in children. This has yet to be done in infancy and toddlerhood in a way that integrates multiple systems of emotion regulation.

THE ROLE OF INFANT NEGATIVE EMOTIONALITY

Prior research demonstrates that heightened negative emotionality increases infants' susceptibility to the negative effects of insensitive caregiving, and at the same time, infants who are higher in negative emotionality also benefit the most from receiving sensitive caregiving (Stright et al., 2008). In the current study, it was hypothesized that infant negative emotionality would moderate the association between maternal sensitivity to distress and toddlers' emotion dysregulation, however, this was not the case. Further, infant negative emotionality was not directly associated with emotion dysregulation. This finding was surprising given that previous theoretical and empirical work has demonstrated that negative emotionality directly affects emotion dysregulation (Mesman et al., 2009; Perry et al., 2018; Rothbart & Bates, 2006). Additionally, research that has intentionally sampled for heightened levels of emotion dysregulation has found that children's negative emotionality does, indeed, moderate the association between maternal caregiving and emotion dysregulation (Dollar & Calkins, 2019). Thus, it is possible that there is not enough variability in this community sample in relation to this particularly more clinically oriented outcome for a significant effect to be observed. Future research could continue to test how infants' and toddlers' temperamental characteristics, such as negative emotionality may contribute to emotion dysregulation directly and in conjunction with parenting behaviors in samples with a greater range of risk, particularly at the high end of risk.

Indirect Effects and Mechanisms of Transmission

Contrary to prediction, maternal sensitivity did not mediate the association between maternal global and parenting-specific emotionality to toddlers' emotion dysregulation. This was unexpected given the ample support that parenting has received as a mechanism of transmission in the extant literature (Bridgett et al., 2011). However, this is not the first study that has generated inconsistent findings when using maternal sensitivity as a mechanism. For example, Leerkes et al. (2017) found that maternal sensitivity did not mediate the association between maternal physiological dysregulation and (a) infants' attachment disorganization and (b) maternal report of toddlers' externalizing behavior problems. Recently, there has been a push for the theoretical and methodological reconceptualization of maternal sensitivity given this limited predictive validity in many studies (Woodhouse, Scott, Hepworth, & Cassidy, 2020). An alternative measure, secure base provision, focused primarily on maternal responsiveness to children's higher level distress cues rather than the more qualitative components of maternal sensitivity, and found that secure base provision predicted infant attachment security over and above effects of maternal sensitivity, suggesting that secure base provision was a better predictor of attachment than standard conceptualizations of maternal sensitivity.

Four processes, other than maternal sensitivity, may explain the associations between both maternal negative emotionality and mother-oriented emotions with emotion dysregulation. First, children model behavior after what they observe from others. Mothers who are prone to display negative emotions throughout the day, including in their children's presence may model such behavior for their children to mimic. Over time, children learn how to respond to stressful or scary situations based on how their caregivers have responded in previous experiences. Modeling is an intentional and cognitive processes that reflects interpretation of the others' emotional state (Parkinson & Simons, 2009). Similarly, emotion contagion, or the automatic process of "catching" another's affective state, may contribute to the association between maternal negative emotionality and toddlers' emotion dysregulation. Infants' experiences with frequent negative emotional states may become customary or habitual for them. Third, during early infancy, parent-child co-regulation has been associated with later child outcomes. Co-

regulation occurs when one social partner's regulation affects the regulation of another social partner. The process differs from modeling and emotion contagion in that co-regulation is very dyadic and transactional, such that both partners create sequencing of behaviors for the other (Evans & Porter, 2009). Early co-regulation processes can affect children's long-term regulatory abilities such as better regulation of the vagal system (Porter, 2003). Mothers who exhibit higher levels of negative emotions or feel higher levels of mother-oriented emotions may interact with their children in subtle ways that undermines children's emotion regulation development. Physiological indicators such as bodily tension and rapid heart rate in mothers can be difficult to observe in a research setting but are felt by children when seeking contact comfort from their mothers. Mothers higher in negative emotionality may be able to mask their otherwise insensitive behavior during these brief observations, but physiological reactivity is much more difficult to control and could affect children. Lastly, given the current study drew from a sample of mothers and their biological children, shared genetics must be considered. Research on twins has demonstrated that heritability estimates in infant negative emotionality range from .20 to .60, suggesting that 20 to 60% of negative emotionality can be explained by genetic transmission (Saudino, 2005). Further, twin studies examining the heritability of emotion regulation and dysregulation reveal similar heritability estimates, ranging from .22 to .55 (Hawn, Overstreet, Stewart, & Amstadter, 2015). Thus, a range of mechanisms, beyond maternal sensitivity to distress as measured in this study, may in fact explain the observed associations between both (a) maternal trait negative emotionality and (b) mother-oriented negative emotions and toddler emotion dysregulation. That these associations were significant over and above a range of covariates and competing predictors underscores the robustness of the role maternal negative emotions may play in shaping children's regulatory abilities.

Role of Covariates

I examined the role of maternal race in the model, first as a moderator using multigroup analysis, and then as a covariate once the moderation was determined to be non-significant. That maternal race did not moderate the model, supports previous research that suggests that the differential effects of emotion-related processes in Black and White mothers emerge after

infancy (Dunbar et al., 2017). In the current study, White mothers were higher in maternal sensitivity to distress compared to Black mothers. Simple correlations suggested that White mothers were higher in observed sensitivity and supportive emotion socialization and lower in non-supportive emotion socialization. Non-supportive emotion socialization has typically been associated with maladaptive outcomes, including emotion dysregulation (Shaffer, Suveg, Thomassin, & Bradbury, 2012). However, more recent work has begun to examine how non-supportive emotion socialization may be adaptive for Black mothers and children. Although Black mothers tend to engage in more non-supportive emotion socialization (e.g., higher rates of emotion minimizing behavior, punitive interactions regarding negative emotion), the detrimental effects on children's social and emotional outcomes are not observed (Cunningham, Kliewer, & Garner, 2009; Labella, 2018). This, in part, could explain the non-significant effect from maternal sensitivity to distress to toddlers' emotion dysregulation in this study. That is, given non-supportive emotion socialization was part of a larger latent variable there may be value in examining the discrete role that non-supportive emotion socialization may have in predicting emotion dysregulation and how that varies by maternal race.

Maternal age served a minimal role in the full model. Mothers who were older were higher in maternal sensitivity to distress. In contrast, maternal SES alone predicted 44% of the variance in maternal sensitivity (more than half of the 77% variability accounted for by all predictors, such that mothers who were of higher SES (i.e., higher level of education and higher income-to-needs ratio) were higher in maternal sensitivity to distress. In addition, higher SES mothers were higher in infant-oriented emotions. Previous research, with this sample and others, have demonstrated that in addition to direct effects, SES moderates certain associations between maternal characteristics and sensitivity. This has been demonstrated with maternal depressive symptoms, suggesting that maternal depressive symptoms only undermine sensitive caregiving for mothers lower in SES (Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Norcross, Bailes, & Leerkes, 2020). Given the conceptual overlap in maternal depressive symptoms and maternal emotionality, it is likely that similar processes are occurring here. Mothers who are of lower SES may have lesser access to resources to help offset the negative effects of their negative emotionality. This has yet to be examined in the extant literature. Given the strong effects of SES

in predicting maternal sensitivity, it is of utmost importance to identify factors that support more sensitive caregiving in the context of low SES. Additionally, future research should explore the degree to which maternal SES moderates the associations between maternal global emotionality and parenting specific emotions and maternal sensitivity.

Concurrent depressive symptoms were considered as time-varying covariates at each wave. Consistent with prior research, mothers who were higher in depressive symptomology were higher in prenatal negative emotionality, mother-oriented emotions, and had toddlers who were higher in emotion dysregulation. These constructs were assessed via mostly maternal report, and mothers higher in depressive symptoms may be more negative and biased in reporting on their own behavior and their infants' behavior. Inconsistent with previous work (Field, 2010), maternal depressive symptoms were not associated with maternal sensitivity to distress. This could be due to the fact that maternal negative emotionality was included in the model as well and could be accounting for any overlapping variance in predicting maternal sensitivity.

Implications

Results from the current study can be used to inform parenting interventions and education programs. New mothers face pressure from external and internal sources to be or at least appear happy about the birth of a new child and parenting that child. Although common experiences with post-partum depression and anxiety are becoming more openly discussed today, there is still some taboo around mothers feeling negative emotions in response to a new infant, particularly so if those emotions are about the infant. Results from the current study suggest that global negative emotions and mother-oriented emotions are harmful to children's long-term development. Thus, providing mothers with an outlet where they can process these negative emotions may be adaptive for children's long-term emotion outcomes. Screening mothers for negative emotionality and teaching them that negative emotions are normal and do not reflect negatively upon their parenting may alleviate some of the stress that mothers have from feeling angry when their infant cries. This may facilitate subsequent efforts to help mothers learn to

adaptively regulate these emotions. Indeed, interventions that target maternal emotion regulation have been effective in promoting positive caregiving (e.g., Zimmer-Gembeck et al., 2019), and some work has emerged to suggest that these caregiving interventions promote better physiological regulation in childhood (Lind et al., 2020; Tabachnick, Raby, Goldstein, Zajac, & Dozier, 2019). That maternal emotionality assessed prenatally predicted children's emotion dysregulation at 2 years suggest that it is possible and potentially valuable to identify mothers who would benefit from such support in the prenatal period.

General education about the function of infant distress as a means of communication may be one useful tactic for parental education, in particular for mothers who are higher in global negative emotionality. Teaching mothers about perspective taking during their interactions with their infants is critical as it may enhance empathy and reduce negative emotions, which has been associated with higher levels of maternal sensitivity in other studies (Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2018). It is also possible that mothers are higher in mother-oriented emotions and global negativity in part because of negative experiences during their own childhood and perspective taking could provide a valuable starting point to helping mothers work through the legacy of their own negative childhood experiences (e.g., *ghosts in the nursery*; Bolten, 2019). For example, experiences from mothers' own childhoods shape social information processing tendencies that mothers engage in with their own infants (Berlin, Appleyard, & Dodge, 2011; Leerkes et al., 2020).

Strengths and Limitations

The current study has many strengths. First, it is the first empirical study to formally test Leerkes and Augustine's (2019) model of the transmission of emotion from mothers to infants. Specifically, I tested the degree to which maternal emotions were directly (i.e., Figure 2, path a) and indirectly (i.e., Figure 2, path b) associated with children's social and emotional outcomes. Although the current study provided limited support for the model, findings from the current study support the notion that maternal global negativity and mother-oriented emotions were directly associated with toddlers' emotion dysregulation, and that this conceptualization of

caregiving may not function as a mechanism of transmission. Findings also provide ample directions for future research to continue testing this model using other conceptualizations of caregiving and focusing on specific domains of children's emotion dysregulation.

Second, the current study drew from multiple sources of information, including mother-report of mother characteristics, mother report of infant characteristics, and observationally coded infant and mother behavior. Utilizing data from multiple sources increases construct validity by minimizing mono-method bias (Shadish et al., 2000). Additionally, reporter bias was statistically reduced in the model by setting variables obtained from the same measure or task to covary (e.g., estimating covariance of maternal global positivity and global negativity). Another strength of the current study was the inclusion of maternal depressive symptoms as a time-varying covariate. Frequently, in the literature, maternal negativity is confounded with maternal depression, and by controlling for concurrent depressive symptoms, I better captured the isolated effects of negative emotionality on parenting and toddlers' emotion dysregulation. Controlling for maternal depressive symptoms is also beneficial because depression is a known factor that alters parental reports of child behavior.

In the current study, I considered the role of maternal race, both at the measurement level and at the structural level. All self-report measures were tested for measurement invariance between Black and White mothers, and items contributing to non-invariance were removed. Determining measurement invariance at the item-level ensures that the factor loadings are similar for each group. Further, multiple group analyses were conducted to see if maternal race moderated any of the structural paths. Thus, in the current study, the role of race was considered at multiple levels in forming variables, analyzing data, and interpreting the results, lending stronger credence to the idea that these processes during infancy are similar across Black and White mothers.

There are also methodological and conceptual limitations that need to be considered. Although measurement invariance was evaluated, only metric invariance, or weak invariance was obtained at the measurement level. Metric invariance ensures that item's factor loadings are similar across groups but does not place any constraints or requirements on the intercepts or

variance of the loadings and of the latent construct. Stricter invariance may result in a better statistical model that operates similarly well both Black and White mothers but would likely require the removal of more items. Some of the questionnaires and scales used in the current study had a smaller number of items, and thus, removing additional items would result in scales with fewer than 4 or 5 items. Many measures are not developed to undergo this level of psychometric scrutiny, and thus, results should be interpreted in light of this limitation. Another limitation of the current study is that results may be partially driven by the shared method variance in maternal report across time rather than by the association between variables. Although this does not completely undermine the results of the current study, it is important to consider that the significant effects present in many parts of the model may be capturing shared method variance. Method effects were accounted for within measures used at the same time point, but method effects were not estimated for all mother reported items, as is recommended by some methodologists (Shadish et al., 2002). The current study was already overparameterized and estimating method effects across variables would have further contributed to the complex model.

The current study also has conceptual limitations. First, I did not consider the role of maternal regulation and regulatory processes. It is likely that parenting and child outcomes may be undermined among mothers who are prone to display higher levels of negative emotions and mother-oriented emotions while also exhibiting poor regulation of such emotions. Previous work in this sample has demonstrated that maternal physiological arousal and regulation do not impact parenting behaviors independently, but rather when considered together, there is a significant effect, such that mothers who are higher in physiological arousal and lower in physiological regulation have the worst parenting outcomes, but that this mediated by mother-oriented cry processing (Leerkes et al., 2015). Additionally, this pattern of physiological reactivity and regulation has been found to be associated with more behavior problems during toddlerhood (Leerkes et al., 2017). Importantly, that finding, also in this sample, was not explained by maternal sensitivity either. Thus, there is convergence across physiology and maternal reported emotions in that both were directly associated with maladaptive child outcomes but were not mediated by maternal sensitivity. These physiological indicators of reactivity and regulation

were assessed during a parenting task, and thus it is possible that global reactivity and regulation may operate in a similar way, such that there are not direct effects of global emotionality on caregiving, but rather the effects interact with global emotion dysregulation. Future work should explore the degree to which both mothers' global regulation and regulation within a parenting context affect parenting behaviors and emotion regulation outcomes for children.

Conclusion

Drawing from attachment theory, developmental psychopathology, and social information processing theories, the current study examined the degree to which maternal global emotionality was associated with toddlers' emotion dysregulation via parenting-specific emotions and maternal sensitivity to distress. Results revealed a direct path from prenatal negative emotionality to toddlers' emotion dysregulation suggesting that parenting did not function as a mechanism that explains how mothers' global negativity affects toddlers' emotion regulation. Similar effects were revealed for mother-oriented emotions. Further, mothers who were higher in global positivity were more likely to endorse infant-oriented emotions in response to infants' distress, reflecting mothers' use of empathy and sympathy when engaging with a distressed infant. Counter to prediction, observed infant distress was more strongly associated with lower levels of maternal sensitivity to distress when mothers were higher in infant-oriented emotions, suggesting that infant-oriented emotions may not be enough to predict sensitive behavior but rather that mothers' regulation of arousal in response to infant distress may be important as well. There were many strengths of the current study, including the careful attention to the role of maternal race and multiple levels, the longitudinal nature of the study, and the inclusion of positive emotions, which have received much less attention from previous research. Results from the current study can be used to inform parenting intervention and prevention programs, as well as parenting education for new mothers. Findings from this study also provide ample opportunity for future research regarding testing the role of maternal emotionality on toddlers' emotion regulation development, including person-centered approaches, interactions between emotionality components, consideration of maternal emotion regulation, and examination of other potential mechanisms of transmission.

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APPENDIX A: TABLES AND FIGURES

Domain	Construct	Measure	Wave Assessed
Maternal Global Emotionality	Global Positive Emotionality	DES	Prenatal
	Global Negative Emotionality	DES	Prenatal
Maternal Parenting-Specific Emotionality	Infant-oriented emotions	MEQ (sympathy and empathy)	6-months
	Mother-oriented emotions	MEQ (anxiety and frustration)	6-months
Maternal Sensitivity to Distress	Observed maternal sensitivity to distress	Ainsworth's rating scale, 2 tasks	14-months
	Supportive emotion socialization	CTNES	14-months
	Nonsupportive emotion socialization	CTNES	14-months
Toddlers' Emotion Dysregulation Risk	Externalizing behavior problems	BITSEA subscale	26-months
	Emotion dysregulation	BITSEA 2 items	26-months
	Effortful control	IBQ-VSF	26-months
	Observed venting	% time during frustration task	26-months
	Observed infant distress	% time in negative affect during task	26-months
	Observed defiance	% time during clean up	26-months
Infant Negative Emotionality		IBQ-VSF	6-&14-months
Observed Infant Distress		Observed affect, x tasks	14-months
Covariates	SES	Demographic Q (composite of income and education)	Prenatal
	Maternal age	Demographic Q	Prenatal
	Concurrent maternal depression	CES-D	All times
Moderator of Model	Maternal race	Demographic Q	Prenatal

Table 1. Measures Summary Table

Note: DES = Differential Emotions Scale; MEQ = My Emotions Questionnaire; CTNES = Coping with Toddlers' Negative Emotions Scale; BITSEA = Brief Infant/Toddler Social and Emotional Assessment; IBQ -VSF = Infant Behavior Questionnaire – Very Short Form

	N	*M*	*SD*	Min.	Max.
1. Mother Race[a]	131 AA/128 EA				
2. Mother Age	258	25.05	5.41	18	44
3. SES	259	-.03	.88	-1.57	1.82
4. Prenatal Maternal Positive Global Emotionality	258	3.12	.57	1.17	5.00
5. Prenatal Maternal Negative Global Emotionality	258	1.95	.54	1.00	3.52
6. 6-month Infant Oriented Emotions	224	4.08	.73	1.00	5.00
7. 6-month Mother Oriented Emotions	224	1.88	.64	1.00	5.00
8. 6- and 14-month Infant Negative Emotionality	239	3.69	.80	1.91	5.68
9. 14-month Observed Maternal Sensitivity	207	5.08	1.82	1.50	9.00
10. 14-month Supportive Emotion Socialization	225	5.53	.77	2.32	7.00
11. 14-month Non-supportive Emotion Socialization	224	2.12	.85	1.00	5.00
12. 14-month Observed Infant Distress	206	4.20	.27	3.87	5.24
13. 26-month Toddler Effortful Control	213	6.18	1.02	2.86	9.00
14. 26-month Observed Toddler Defiance	199	.07	.17	.00	.82
15. 26-month Observed Venting Behaviors					
16. 26-month Observed Mean Percent Negative Affect	199	.09	.13	.00	.62
17. 26-month Toddler Externalizing Behavior Problems	212	2.02	1.63	0.00	7.00
18. 26-month Toddler Emotion Dysregulation Composite	210	.87	.96	0.00	4.00
19. Prenatal Maternal Depressive Symptoms	258	13.64	8.72	0.00	42.00
20. 6-month Maternal Depressive Symptoms	224	10.72	9.55	0.00	48.00
21. 14-month Maternal Depressive Symptoms	223	11.60	9.67	0.00	50.00
22. 26-month Maternal Depressive Symptoms	213	9.95	7.97	0.00	43.00

Table 2. Descriptive Statistics for Variables of Interest

Note: [a] Maternal race coded as 0 = Black, 1 = White

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Mother Race	--									
2. Mother Age	.35**	--								
3. SES	.45**	.65**	--							
4. Prenatal Maternal Pos. Emotionality	.07	.01	.08	--						
5. Prenatal Maternal Neg. Emotionality	-.09	-0.1	-.18**	.03	--					
6. 6-month Infant-Oriented Emotionality	-.01	.02	.16*	.14*	.09	--				
7. 6-month Mother-Oriented Emotionality.	.11	.10	.14*	-.04	.23**	.07	--			
8. 6- and 14-month Infant Neg. Emotionality	-.26*	-.21	-.21**	-.01	.24**	.16*	.22**	--		
9. 14-month Observed Maternal Sensitivity	.48**	.50**	.50**	-.03	-.12^{t}	.04	.09	-.27**	--	
10. 14-month Supportive ES	.25**	.15*	.24**	.20**	-.10	.14*	-.15**	-.19**	.20**	--
11. 14-month Non-supportive ES	-.20**	-.24**	-.31**	-.10	.13t	-.12^{t}	.17*	.27**	-.36**	-.14*
12. 14-month Observed Infant Distress	-.04	-.02	-.01	.08	.08	.02	.12t	.17*	-.26**	-.01
13. 26-month Toddler Effortful Control	-.04	.02	.07	.17*	-.16*	.21**	-.09	-.03	-.06	.20**
14. 26-month Toddler Defiance	-.02	-.09	-.19**	.01	.05	-.13	-.04	.003	-.13^{t}	.04
15. 26-month Venting Behaviors	.07	.01	-.09	-.02	-.04	.03	-.06	.04	-.13*	.02
16. 26-month Mean Percent Negative Affect	.01	-.15*	-.21**	-.04	.05	-.03	-.09	.10	-.13^{t}	.05
17. 26-month Ext. Behavior Problems	-.14*	-.07	-.17*	-.02	.36**	-.01	.18**	.15*	-.12^{t}	-.16*
18. 26-month Emotion Dysregulation Composite	-.25**	-.24**	-.22**	-.05	.23**	.07	.26**	.30**	-.29**	-.24**
19. Prenatal Maternal Depressive Symptoms	-.15*	-.15*	-.28**	-.10	.66**	-.004	.18**	.21**	-.13^{t}	-.21**
20. 6-month Maternal Depressive Symptoms	-.24**	-.23**	-.28**	-.08	.29**	.03	.30**	.27**	-.16*	-.26**
21. 14-month Maternal Depressive Symptoms	-.21**	-.19**	-.31**	-.01	.40**	-.01	.28**	.29**	-.17*	-.28**
22. 26-month Maternal Depressive Symptoms	-.17*	-.25**	-.30**	-.13^{t}	.40**	-.01	.36**	.20**	-.16*	-.24**

Table 3. Bivariate correlations of variables of interest.

Note: a Maternal race coded as 0 = Black, 1 = White, $^{**}p < .01$, $^{*}p < .05$, $^{t}p < .10$.

	11.	12.	13.	14.	15.	16.	17.	18.	19	20.	21.
11. 14-month Non-supportive ES	--										
12. 14-month Observed Infant Distress	.16*	--									
13. 26-month Toddler Effortful Control	-.06	.08	--								
14. 26-month Toddler Defiance	.06	.01	-.16*	--							
15. 26-month Venting Behaviors	.03	-.01	.01	-.48**	--						
16. 26-month Mean Percent Negative Affect	.14*	.03	-.14^{t}	.81**	.61**	--					
17. 26-month Ext. Behavior Problems	.20**	-.04	-.26**	.06	.07	.09	--				
18. 26-month Emotion Dysregulation Composite	.23**	.05	-.19**	.09	-.13*	.12^{t}	.42**	--			
19. Prenatal Maternal Depressive Symptoms	.11	.04	-.11	.08	.05	.07	.25**	.27**	--		
20. 6-month Maternal Depressive Symptoms	.19**	-.09	-.04	.05	.05	.05	.24**	.27**	.41**	--	
21. 14-month Maternal Depressive Symptoms	.20**	-.04	-.10	.05	.02	.01	.31**	.35**	.48**	.65**	--
22. 26-month Maternal Depressive Symptoms	.28**	.02	-.22**	.08	-.01	.05	.31**	.30**	.45**	.47**	.54**

Note: a Maternal race coded as 0 = Black, 1 = White, $^{**}p < .01$, $^{*}p < .05$, $^{t}p < .10$.

Construct	Indicator	β
Maternal Sensitivity to Distress at 14-months	→ Observed Maternal Sensitivity	.70**
	→ Supportive Emotion Socialization	.33**
	→ Non-supportive Emotion Socialization	-.43**
Toddlers' Emotion Dysregulation at 26-months	→ Mother-reported Emotion Dysregulation	.66**
	→ Mean Percent Negative Affect	.17*
	→ Effortful Control	-.31**
	→ Externalizing Behavior Problems	.60**
Paths from co-variates to key constructs (not included in Figure X)		
Maternal Age	Infant-Oriented Emotions	-.12
	Mother-Oriented Emotions	.04
	Maternal Sensitivity to Distress	.31**
	Toddlers' Emotion Dysregulation	.01
SES	Infant-Oriented Emotions	.30**
	Mother-Oriented Emotions	.19*
	Maternal Sensitivity to Distress	.27**
	Toddlers' Emotion Dysregulation	-.06
Race	Infant-Oriented Emotions	-.13
	Mother-Oriented Emotions	.14
	Maternal Sensitivity to Distress	.32**
	Toddlers' Emotion Dysregulation	-.07
Covariances (Method Effects)		
Maternal Prenatal Global Positivity with Global Negativity		.12**
Infant-Oriented with Mother-Oriented Parenting-Specific Emotions[a]		.02
Supportive Emotion Socialization with Non-Supportive Emotion Socialization[a]		.02
Externalizing Behavior Problems with Mother-reported Emotion Dysregulation[a]		-.16

Table 4. Factor loadings and paths eliminated from figures.

Note. Maternal race coded 0 = Black, 1 = White. a effect was not statistically significant and was removed from the model. These coefficients were not in the final model and are here for demonstrative purposes only.

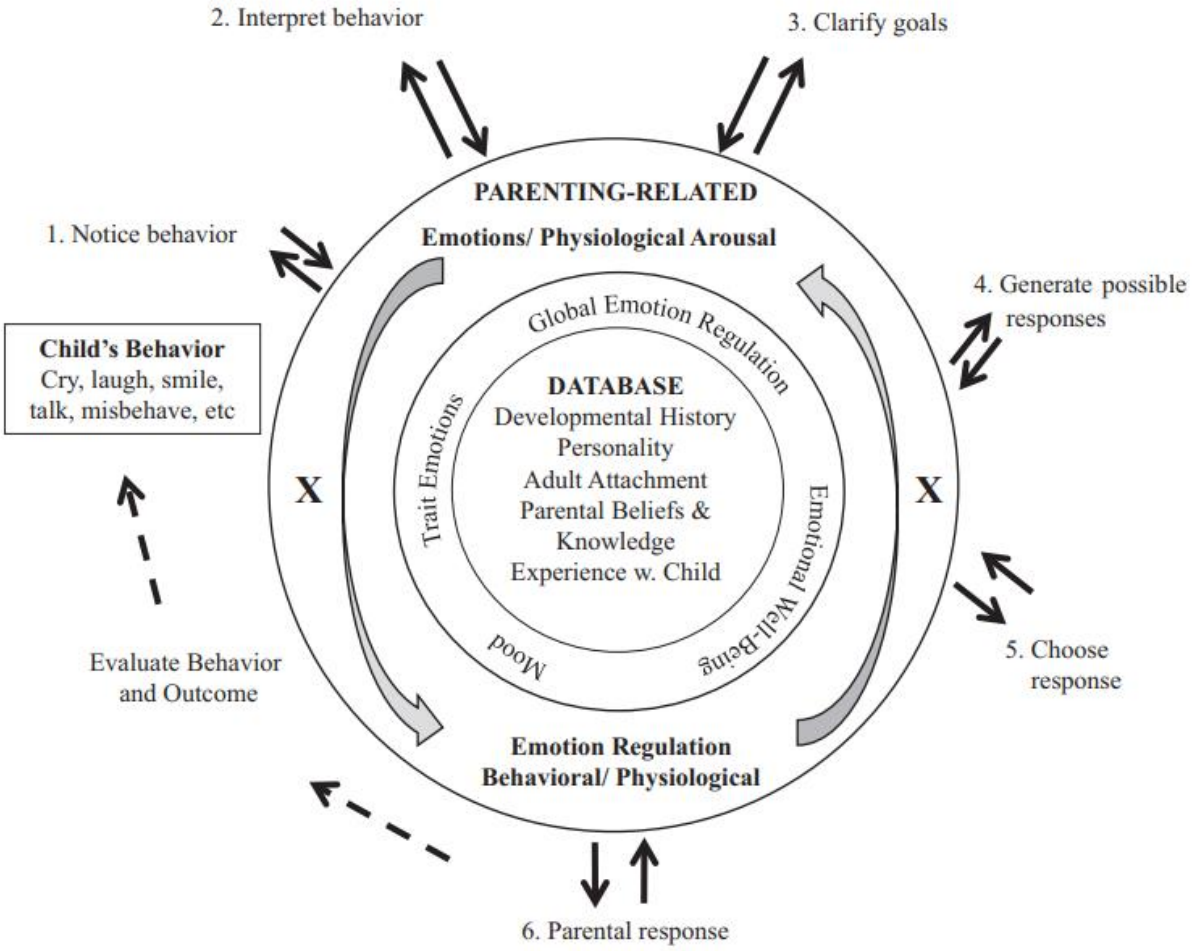

Figure 1. From Leerkes & Augustine, 2019. Integrated model of the role of parenting-related emotions in parenting.

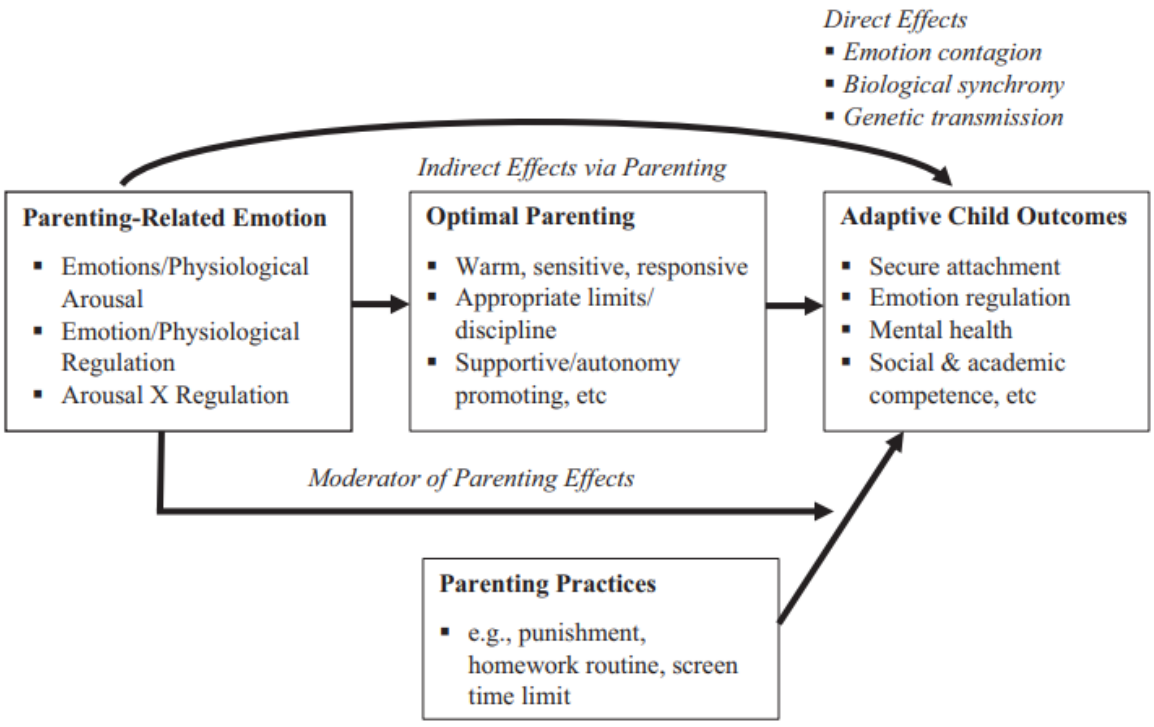

Figure 2. From Leerkes & Augustine, 2019. Pathways by which parental emotions are associated with child outcomes.

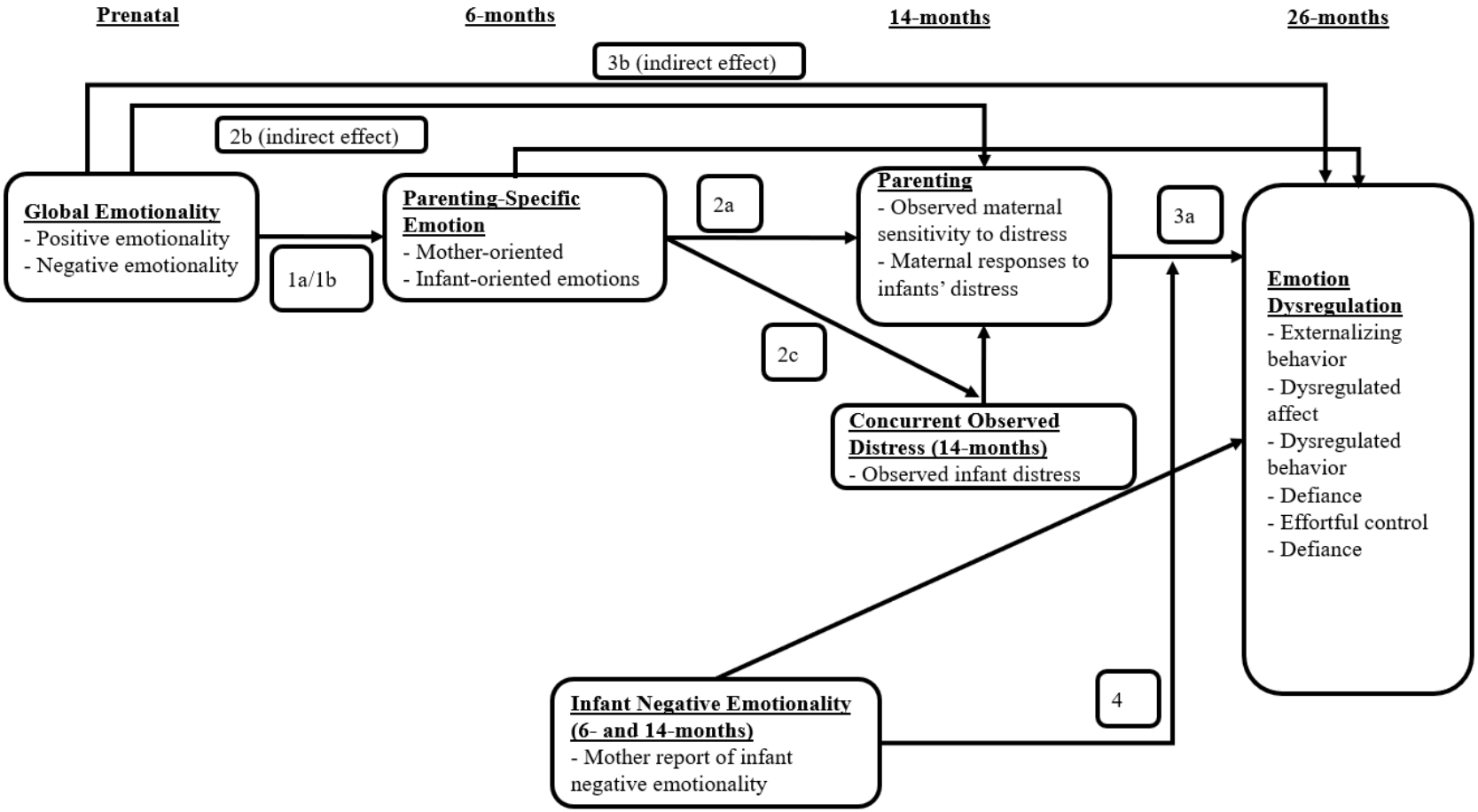

Figure 3. Conceptual model for the current study. Covariates of SES and depression and maternal race as a moderator eliminated for simplicity. Hypothesis paths are labelled. Missing are labels of indirect paths.

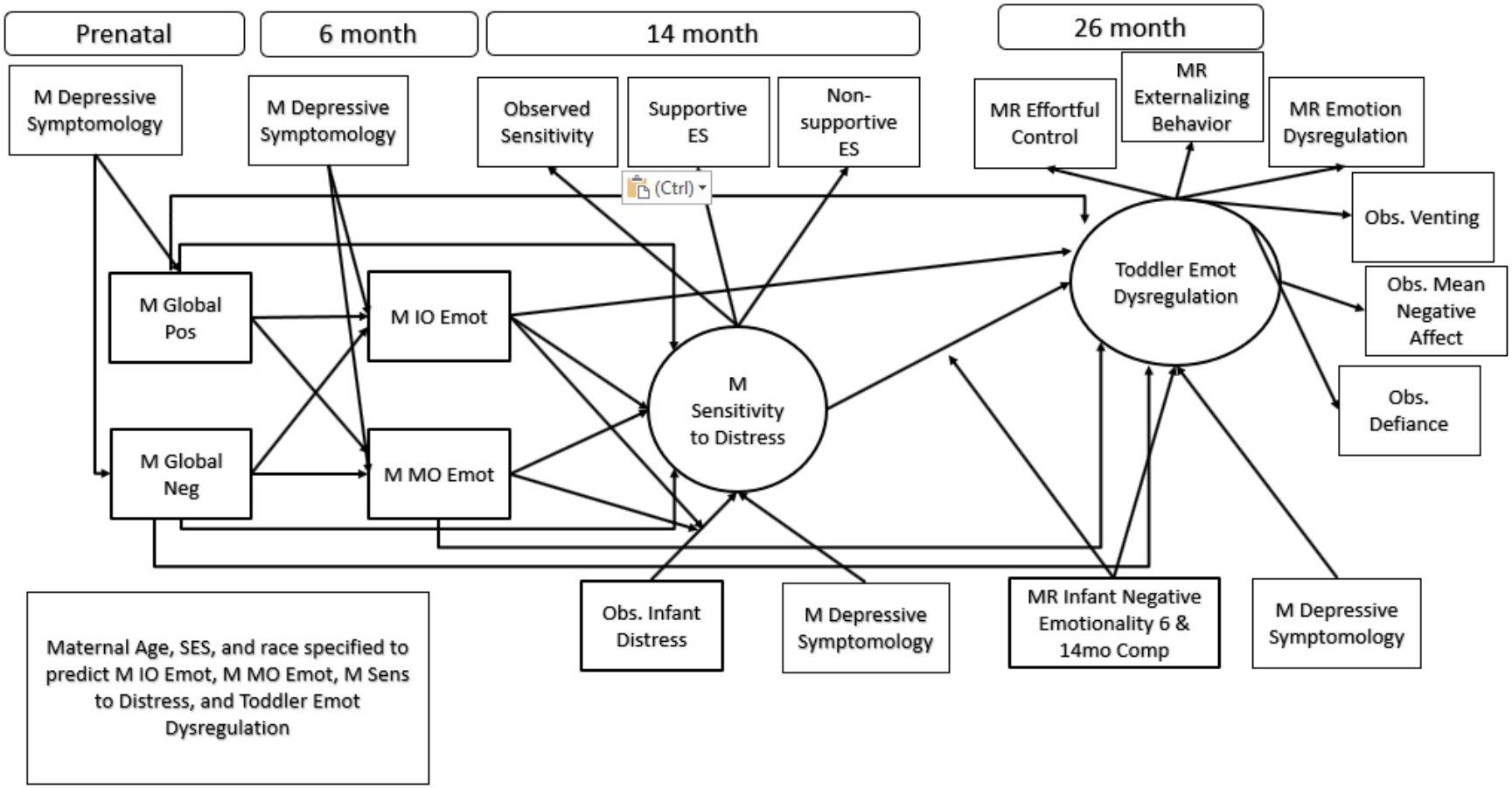

Figure 4. Hypothesized model for current study. Maternal SES = composite of mother education and income-to-needs ratio.

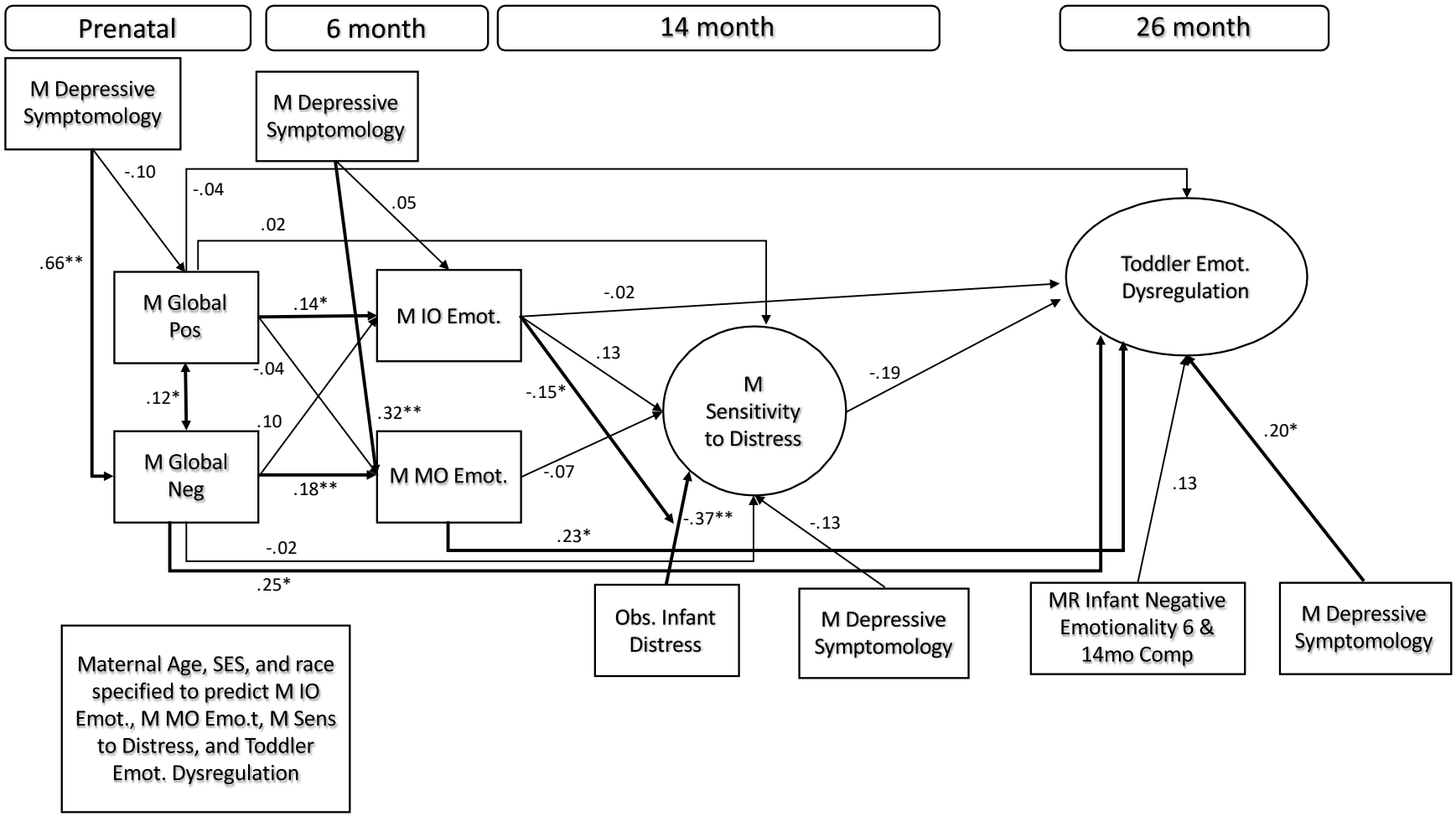

Figure 5. Final structural model. **p < .01, *p < .05, t p < .10.

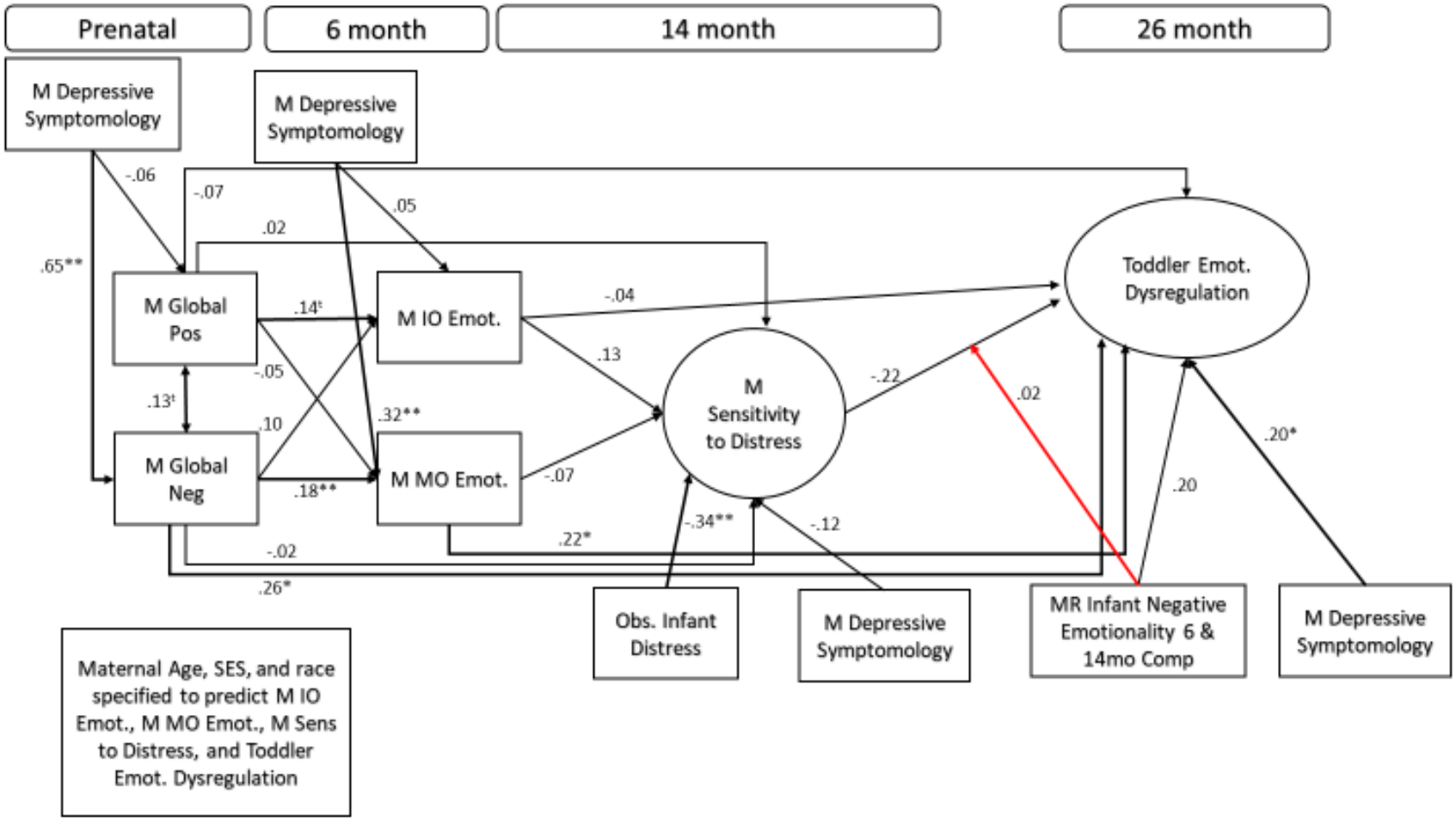

Figure 6. Structural model with latent variable moderation specified (red path). **p < .01, *p < .05, t p < .10. The red path should be the only path interpreted, but values for all paths are provided.

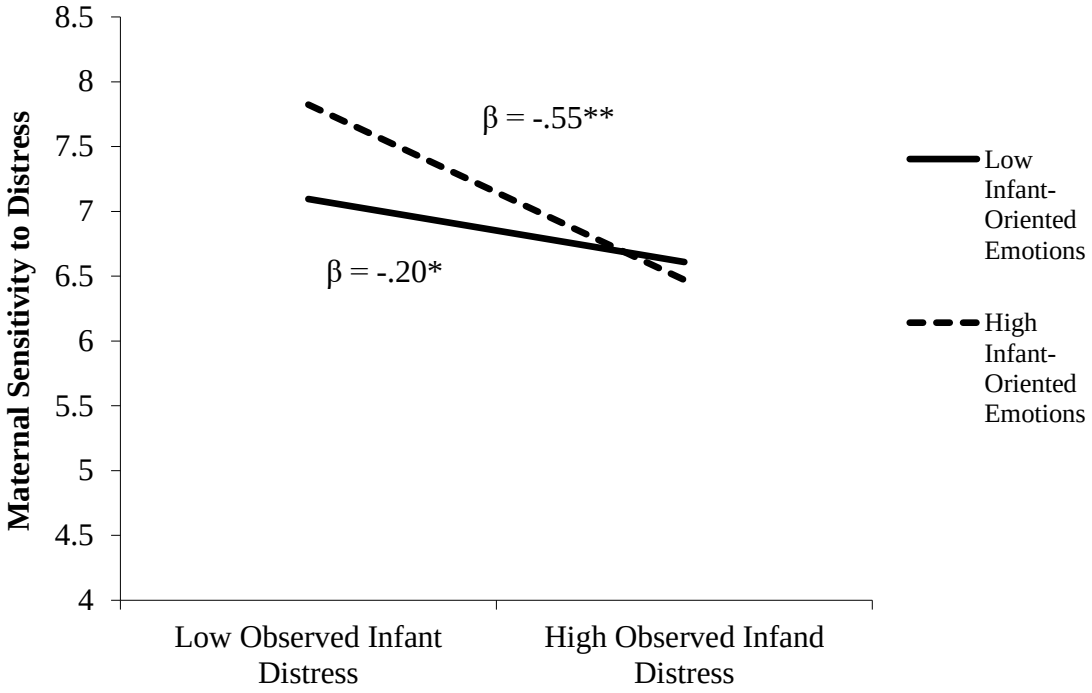

Figure 7. Interaction between observed infant distress at 14-months and infant-oriented emotions at 6-months predicting maternal sensitivity to distress. *p < .05, **p < .01.

APPENDIX B: MEASUREMENT INVARIANCE

Given the demographic composition of this sample regarding maternal race, establishing that measures were invariant (i.e., functioned similarly for Black and White mothers) was critical to enhance statistical and construct validity. There are multiple types of measurement invariance that vary in their degree of strict invariance. Commonly used are configural invariance (i.e., similar pattern of factors and loadings across groups), metric invariance (i.e., similarity in item-level factor loadings across groups), scalar invariance (i.e., similarity in item intercepts across groups), and uniqueness invariance (i.e., similarity in error variances across groups). In the current study, configural invariance and metric invariance were established using visual examination and testing series of multigroup confirmatory factor analysis (MGCFA). Scalar invariance is important for comparing mean-level differences in groups and given that the current study is examining process-level differences, establishing scalar invariance was not a central goal (Milfont & Fischer, 2010; White, Umaña-Taylor, Knight, & Zeiders, 2011). However, it should be noted that in establishing configural and metric invariance, many measures in the current study were also scalar invariant.

All mother self-report scales with more than 5 items in the scale underwent measurement invariance testing and evaluation. Some measures in the current study had already established that scales were configural and metric invariant, and thus they were not recalculated for the purpose of this study, and those include the CES-D at each wave and the IBQ-VSF negative emotionality scale at 6 and 14-mnths, and the IBQ-VSF effortful control scale at 26-months (Leerkes et al., 2017; Leerkes et al., 2016). The CTNES scales of supportive and non-supportive emotion socialization underwent measurement invariance testing in another study (Leerkes et al., 2020), and the same variables were used in the current study. Thus, in total, for the current study, measurement invariance testing was conducted on DES positivity, DES negativity, MEQ mother-oriented, MEQ infant-oriented, and the BITSEA externalizing behavior scales. In establishing configural and metric invariance, latent factors were created on the measure's summary score level. Mplus includes convenience features to test measurement invariance easily

and quickly by using ANALYSIS and MODEL = CONFIGURAL METRIC SCALAR. After specifying the confirmatory factor analysis, Mplus will produce output that automatically calculates the number of parameters, $\chi 2$ value, degrees of freedom, and a p-value for the configural, metric, and scalar models. Then, models are compared using $\chi 2$ difference tests, and statistics are provided to compare the configural to the metric model and metric to scalar model. To establish configural invariance, model fit was examined for the configural model of the Black and White mothers and the significance of the factor loadings were examined. If the $\Delta\chi 2$ between the configural and metric models was statistically significant, then factor loadings were examined and compared between Black and White mothers. The item with the largest loading difference was removed and then analysis was re-run until the configural and metric model were not significantly different from each other, suggesting that the models were equivalent for Black and White mothers.

DES Positivity

First, configural variance was examined. Results indicated that the configural model showed very good model fit, $\chi 2(36) = 52.87$, $p = .04$, RMSEA = .060, CFI = .97, SRMR = .05, and all factor loadings were significantly different from 0 for both Black and White mothers. Taken together, configural invariance was supported in the model without removing any items. Then the comparison of $\chi 2$ between the configural and metric models was examined and suggested that the metric model did not fit worse than the configural model, $\Delta\chi 2\ (8) = 14.52$, $p = .07$, and thus, the scale was metric invariant as is and all 9 items were kept in the scale construction.

DES Negativity

Configural invariance was examined, and suggested that model fit was adequate, $\chi 2(412) = 850.01$, $p < .001$, RMSEA = .09, CFI = .83, SRMR = .07. All factor loadings were significantly different from 0 for both Black and White mothers, supporting configural

invariance. Compared to the configural model, the metric model did not fit significantly worse, $\Delta\chi 2$ (22) = 25.73, p = .26, and thus, all 27 items were kept in for analysis.

MEQ Infant-Oriented Emotions

Model fit for the configural model was poor, $\chi 2(18) = 108.98$, $p < .001$, RMSEA = .21, CFI = .71, SRMR = .11. Item 1 (i.e., *I feel sad for my baby*.) did not load significantly for Black mothers (b = .22, SE = .23, p = .34), and it was removed, and the model was rerun. Model fit was still poor, albeit significantly better than the original model, $\chi 2(10) = 52.33$, $p < .001$, RMSEA = .20, CFI = .82, SRMR = .09. In this analyses, item 6 (i.e., *I feel sorry for my baby*.) also did not load significantly (b = .42, SE = .27, p = .12). After removal, the model fit better, but fit was still poor, $\chi 2(4) = 28.86$, $p < .001$, RMSEA = .24 CFI = .85, SRMR = .07. All items loaded significantly for both Black and White mothers, but item 20 (i.e., *I feel protective of my baby*.) factor loadings were very different (Black b = 1.66, SE = .49, p = .001; White b = .44, SE = .20, p = .03). The item was removed, and the model was rerun. At this point, the model was fully saturated. The metric model did not fit significantly better than the configural model, $\Delta\chi 2$ (2) = 2.36, p = .31.

MEQ Mother-Oriented Emotions

Model fit for the configural model was poor, $\chi 2(54) = 183.89$, $p < .001$, RMSEA = .15, CFI = .77, SRMR = .10. Examination of the factor loadings suggested that item 19 (i.e., *I feel annoyed at my baby for over-reacting*.) had the largest difference between Black (b = .74) and White mothers (b = .37). It was removed and the model was rerun. This model fit significantly better but overall fit was only moderately improved, $\chi 2(28) = 113.84$, $p < .001$, RMSEA = .17, CFI = .81, SRMR = .08. No other discrepancies in item loadings were observed, and thus, no further modifications were made to the model. The metric model did not fit better than the configural model, $\Delta\chi 2$ (6) = 2.19, p = .90.

BITSEA Externalizing Behavior Problems

First, configural variance was examined. Results indicated that the configural model showed relatively poor model fit, $\chi2(28) = 64.49$, $p < .001$, RMSEA = .11, CFI = .71, SRMR = .08. Examining the factor loadings showed that item 33 (i.e., *When upset, gets very still, freezes, or doesn't move.*) did not load significantly for Black ($p = .09$) or White mothers ($p = .13$). Thus, this item was removed, and the analysis was rerun. Model fit was improved after removing this item from the model $\Delta\chi2\ (10) = 22.03$, $p = .01$, but the overall model fit was still poor. Factor loadings were examined, and item 27 (i.e., *Is destructive, breaks things on purpose*.) had the largest difference between Black (b = 1.26) and White mothers (b = .38), and thus it was removed, and the analysis was rerun. This model fit the data significantly better, $\Delta\chi2\ (18) = 47.832$, $p < .001$, and the overall model had excellent fit, $\chi2(10) = 12.70$, $p = .24$, RMSEA = .05, CFI = .96, SRMR = .05. The metric model also did not fit the data significantly better than the configural model, $\Delta\chi2\ (4) = 1.62$, $p = .80$, indicating that the data were metric invariant after removing two items.